

JET AIRWAYS 



BOEING 777

**STANDARD OPERATING
PROCEDURES**

JET AIRWAYS

B777 Standard Operating Procedures

GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT



CENTENARY
CELEBRATIONS
CIVIL AVIATION,
INDIA

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नागर विमानन विभाग
महानिदेशक नागर विमानन का कार्यालय
सफदरजंग एयरपोर्ट के सामने
नई दिल्ली - ११० ००३

TELEGRAMS: AIRCIVIL

Reference: No.:
Dated:

संख्या : AV-22014/48/2012-FSD
दिनांक : 22nd August, 2012

To

M/s Jet Airways (India) Ltd
Siroya Centre, Flight Operations Department, 2nd Floor,
(Behind ITC Maratha and Grand Hyatt Hotel)
Sahar Airport Road, Andheri (East)
Mumbai-400099.

Subject: Approval of B-777 Standard Operating Procedures (SOP)

Sir,

Reference is made to your letter No. JA/ OPS/DGCA/006-12 dated 25th July, 2012 on the subject cited above.

The Standard Operating Procedures (SOP) of B777 has been examined and accepted by Flight Standard Directorate of this office.

Yours faithfully,

(Karan Singh)

Section Officer (FSD)

For Director General of Civil Aviation

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Forward

The purpose of Normal Procedures (NP) is to:

- provide the operating procedures and systems information the flight crew needs to safely and efficiently operate the 777 airplane during all anticipated airline operations
- serve as a comprehensive reference for use during transition training for the 777 airplane
- serve as a review guide for use in recurrent training and proficiency checks
- provide necessary operational data to ensure that legal requirements are satisfied
- establish standardized procedures and practices to enhance Jet Airways operational philosophy and policy.

Preface

BOEING 777-300 ER is certified in accordance with JAR 25 and ICAO Annex 16 as a Transport Category “D” aircraft.

Jet Airways policy regarding use of equipment and utilization of operating minima must be adhered to.

Normal Procedures are to be used by Jet Airways B777 flight crew for the routine operation of the aircraft. Strict adherence is compulsory for all crews in all phases of the flight, except under unforeseen circumstances, where only the pilot's good judgment governs. No procedure or action should be taken that violates limitations as outlined in respective B777 FCOM / AFM / FCTM chapter or applicable Dispatch Deviation Procedure Guide.

All actions of a procedure are either required to operate the aircraft safely in the related phase of the flight or to prepare the aircraft for the next phase of the flight. Each action is assigned to a specific crew member to ensure coordination.

While the sequence of these procedures follows the phases of flight, the sequence of actions for the procedure follows a standardized scan of panels or equipment and should be followed, except when required otherwise by the logic of action or priority or basic airmanship.

Note : Suggestions / comments from the flight crew shall be sent to B 777 fleet office for consideration / incorporation as subsequent revisions.

Chief Pilot – Boeing 777

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Normal Procedures

Introduction

Normal Procedures

Introduction

General

This chapter gives:

- an introduction to the normal procedures philosophy and assumptions
- step by step normal procedures

Controls and Indicators - Nomenclature

Controls and indicators appear in all UPPERCASE type to correspond to the words on the control panel or display. For example, the following item has UPPERCASE words to match what is found on the panel:

PRIMARY FLIGHT COMPUTERS DISCONNECT switch.. AUTO (guarded position)

The word DISCONNECT is spelled out, even though it is abbreviated on the panel.

The following appears in all lower case because there are no words identifying the panel name:

Landing gear panel Set

Normal Procedures Philosophy and Assumptions

Normal procedures verify for each phase of flight that:

- the airplane condition is satisfactory
- the flight deck configuration is correct

Normal procedures are done on each flight. Refer to the Supplementary Procedures (SP) chapter Vol. 1-FCOM for procedures that are done as required, for example the adverse weather procedures.

Normal procedures are used by a trained flight crew and assume:

- all systems operate normally
- the full use of all automated features (LNAV, VNAV, autoland, autopilot, and autothrottle)

Normal procedures also assume coordination with the ground crew before:

- hydraulic system pressurization, or
- flight control surface movement, or
- airplane movement

Normal procedures do not include steps for flight deck lighting and crew comfort items.

Normal procedures are done by memory and scan flow. The panel illustration in this section shows the scan flow. The scan flow sequence may be changed as required.

Configuration Check

It is the crew member's responsibility to verify correct system response. Before engine start, use lights or indications to verify each system's condition or configuration.

If there is an incorrect configuration or response:

- verify that the system controls are set correctly
- check the respective circuit breaker as required. Maintenance must first determine that it is safe to reset a tripped circuit breaker on the ground
- test the respective system light as required

Before engine start, review the EICAS alert messages and status display. If there are unexpected messages:

- check the Dispatch Deviations Procedures Guide (MEL/DDPG) to decide if the condition has dispatch a effect.
- decide if maintenance is needed

If, during or after engine start, there is an alert message:

- do the respective non-normal checklist (NNC)
- on the ground, check the MEL/DDPG

After engine start, EICAS alert messages are the primary means of alerting the flight crew to non-normal conditions or incorrect configurations.

After engine start, there is no need to check status messages. Any message that has an adverse affect on safe continuation of the flight appears as an EICAS alert message.

Note: The EICAS advisory message TCAS OFF is displayed until the TA/RA is selected just prior to takeoff.

Crew Duties

Preflight and post flight crew duties are divided between the Captain and First Officer. Phase of flight duties are divided between the Pilot Flying (PF) and the Pilot Monitoring (PM).

Each crewmember is responsible for moving the controls and switches in their area of responsibility. The Area of Responsibility illustrations in this section show the area of responsibility for both normal and non-normal procedures. Typical panel locations are shown.

The Captain may direct actions outside of the crewmember's area of responsibility.

The general PF phase of flight responsibilities are:

- taxiing
- flight path and airspeed control
- airplane configuration
- navigation

The general PM phase of flight responsibilities are:

- checklist reading
- communications
- tasks asked for by the PF
- monitoring taxiing, flight path, airspeed, airplane configuration, and navigation

PF and PM duties may change during a flight. For example, the Captain could be the PF during taxi but be the PM during takeoff through landing.

Normal procedures show who does a step by crew position (C, F/O, PF, or PM):

- in the procedure title, or
- in the far right column, or
- in the column heading of a table

The mode control panel is the PF's responsibility. When flying manually, the PF directs the PM to make the changes on the mode control panel.

The Captain is the final authority for all tasks directed and done.

Control Display Unit (CDU) Procedures

Usually, during pre-flight, the pilot who is going to be the PF does the CDU set up. However, Final Performance data entries are completed by the First Officer.

Before taxi, the Captain or First Officer may make all CDU entries. The other pilot must verify the entries. Make CDU entries before taxi or when stopped,

when possible. If CDU entries must be made during taxi, the PM makes the entries. The PF must verify the entries and call 'EXECUTE' before they are executed by the PM.

In flight, the PM usually makes the CDU entries. The PF may also make simple CDU entries when workload allows. The pilot making the entries executes the change only after the other pilot verifies the entries and calls 'EXECUTE'.

During high workload, non normal situation, and weather, PF can direct PM to complete set up for approach.

During high workload times, for example departure or arrival, try to reduce the need for CDU entries. Do this by using the MCP heading, altitude, and speed control modes. The MCP can be easier to use than entering complex route modifications into the CDU.

Note : The crew should cease excessive FMC/CDU modifications below 10,000 feet AFE.

Autopilot Flight Director System (AFDS) Procedures

The crew must always monitor:

- airplane course
- vertical path
- speed

When selecting a value on the MCP, verify that the respective value changes on the flight instruments, as applicable

The crew must verify manually selected or automatic AFDS changes. Use the FMA to verify mode changes for the:

- autopilot
- flight director
- autothrottle

During LNAV and VNAV operations, verify all changes to the airplane's:

- course
- vertical path
- thrust
- speed

Verify all changes on the thrust mode display when they occur.

Announcing changes on the FMA and Thrust Mode Display when they occur is a good CRM practice.

Normal Procedures

Guidance

Normal Procedures - Guidance :**Procedures (Scan Flow) and Checklist Philosophy**

The NORMAL checklist is used as a verification to ensure that certain critical or essential steps of the preceding procedure have been accomplished. The amplified procedures of this section serve the dual purpose of defining the procedure to be accomplished for each phase of flight and providing expanded notes appropriate to checklist accomplishment. Certain items are accomplished during the procedure, but are not rechecked during the reading of the checklist. The procedure defined for each phase of flight will be accomplished by recall (scan flow) prior to the reading of the applicable checklist. In all cases the checklist will be read from the electronic or printed checklist.

At no time is the use of a checklist from memory acceptable.

The Captain will call for all checklists during ground operations. The Pilot Flying will call for all checklists in flight.

Normally a Procedure/scan flow will be accomplished before the checklist is called for and read. The point at which the associated procedure/scan flow may be initiated is defined in the preamble of each procedure. For 'Before Start', 'Before Taxi', 'Line-Up', 'Taxi-In' and 'Shutdown' procedures, Captain calls for the procedure and the procedure is accomplished by First Officer. However, no flight control will be moved or positioned until called for. (With the exception of retracting flaps during 'Taxi-In' Procedure)

Each item will be challenged out aloud by the designated crewmember. The responding crewmember will visually confirm that the challenged action has been properly accomplished and will respond appropriately to the challenge, confirming the action or describing the configuration. Any item which has a numerical value or switch position associated with it, (i.e. reference speeds, altimeter settings, Fuel Control Switches etc.) will have the associated value or switch position stated as a part of the response. Any item listing an "AS REQUIRED" response will be responded to by the actual configuration or condition as described in the amplified procedures. When responses are required by both crewmembers (C, F/O or PM, PF), the pilot reading the checklist replies after other crew members have replied. Any action which has not been performed or completed when challenged must be completed before the next challenge is read. If performance of the challenged action cannot be completed immediately, the crewmember responding will reply "STANDBY" or other suitable response to indicate that further reading of the checklist will be suspended until the item can

be accomplished. Both pilots are responsible for visual confirmation that all checklist items are completed.

Each checklist item will be treated separately, read in a command tone, and answered only when the challenged action has been completed and is in agreement with the appropriate response.

Electronic Checklist Normal Protocol

- The ECL will be displayed on the Lower EICAS / Center MFD for all normal and Non-Normal Checklists.
- Completed checklists are always closed by selecting the “CHKL” button on the DSP.
- FO/PM always ensures Lower EICAS/Center MFD (LWR CTR) is armed on DSP, for normal and immediate access to checklists and synoptic displays on Lower EICAS
- ECL verifications and responses:

Operation with the electronic normal checklist is the same as the printed normal checklist except that, there is no need to read aloud or visually confirms items that are complete (green).

For the BEFORE TAKE OFF and LANDING checklists, after the PM announces “_____CHECKLIST COMPLETE,” the PF visually confirms that the CHECKLIST COMPLETE indication is shown, and announces “_____CHECKLIST COMPLETE.”

Similarly, following completion of a non-normal checklist, the PM states: “_____CHECKLIST COMPLETE”. When a non-normal checklist is complete except for the deferred items, and the normal checklist to which the items have been deferred has not yet been done, the PM states: “_____CHECKLIST COMPLETE EXCEPT FOR DEFERRED ITEMS”

- Closed loop (sensed) checklist items change from white to green when the action is taken. The PM is responsible to check off any open loop (not sensed) item and to verify that all closed loop items are green.

The PM verifies that all items have been accomplished and then makes the “_____CHECKLIST COMPLETE” call.

Note : Captain may direct Synoptic and ECL displays to any screens as needed, where glare and other adverse lighting conditions will be minimized, without compromising situational awareness. This may be particularly important in smoke.

Recommended Techniques / Responses

Preflight Checklist

Oxygen Tested, 100% C , Observer(s) then F/O

Flight instruments Heading ____, Altimeter____ C and F/O

Captain will callout the heading indications on his PFD, ND, IFSD and standby compass, Altimeter setting on his PFD and ISFD and elevation shown on his altimeter and the ISFD.

F/O will cross check with his PFD and ND readings and callout.

Any differences will need to be resolved. The altimeter reading must be within 75ft of the airfield elevation.

Parking brake Set

Fuel control switches CUTOFF

Before Start Checklist

Flight deck door Closed and locked F/O

Passenger signs ON F/O

MCP V2____, HDG/TRK____, ALTITUDE C

Takeoff speeds V1____, VR____, V2 ____ C,F/O

CDU preflight Completed C,F/O

Trim ____ Units, 0, 0 C,F/O

Taxi and takeoff briefing Completed PF

Beacon ON F/O

Before Taxi Checklist

Anti-ice ____ F/O

Recall Checked F/O

Autobrake RTO F/O

Flight controls Checked C

Ground equipment Clear C,F/O

Verify that the ground personnel and equipment is clear and pin from ground crew sighted. F/O



B777 Standard Operating Procedures

Descent Checklist

Recall Checked PM
Notes Checked PM
Autobrake _____ PM
Landing data VREF____, Minimums ____ PF/PM
Approach briefing Completed PF

Approach Checklist

Altimeters _____ PM

The PM reads “Altimeter” , responds with barometric subscale setting on both PFDs and ISFD “_____” .The PF verifies and monitors checklist completion.

CRM

Effective Crew Resource Management(CRM) can substantially improve safety in line operations. Technical proficiency, knowledge of aircraft systems and adherence to standard operating procedures continue as the foundation of aviation safety. Effective CRM should also help crew achieve safe conclusion of the flight when non-normals and other problems occur. Jet Airways is committed to fostering a high level of CRM skills. The practice of effective CRM is 'expected behavior' amongst all crewmembers. Pilots should routinely utilize effective CRM skills as discussed during the CRM Annual Refresher sessions. All crew members are expected to build strong CRM skills, so that each pilot can contribute fully during both normal and non-normal line operations.

Crew Effectiveness Markers

The following Crew Effectiveness Markers were developed to assist crewmembers for their understanding and practice of Crew Resource Management. The markers were structured in a checklist format for ease of use and recall. Crewmembers should use the markers as a checklist for decision making and as a guide for crew briefings. They should be reviewed periodically to improve CRM proficiency. CRM will be evaluated in training session, proficiency check, and line check utilizing the Crew Effectiveness Markers. The Crew Effectiveness Markers can also serve as a debriefing tool after a line flight or training event. Potential exists for valuable new learning if a crew conducts a frank yet positive self-evaluation following significant flight events. Debriefings can be conducted by the Captain, but may be initiated by anyone in the crew. Frequent, open communications and active listening are consistently identified as key characteristics of the most effective flight crews.

Overall Technical Proficiency

- Set a professional example.
- Adhere to SOP, Aircraft Rules, sterile cockpit, etc.
- Demonstrate high level of flying skills.
- Be adept at normal and non-normal procedures.
- Maintain thorough systems knowledge.

Briefing and Communication

- Set an open tone.
- Fully brief operational / safety issues.
- Explicitly encourage participation.
- All are obligated to seek and give information.
- State how SOP deviations will be handled.
- Include cabin crew

Leadership and Teamwork

- Balance authority and assertiveness.
- Promote continual dialogue.
- Adapt to the personalities of others.
- Use all available resources.
- Share doubts with others.

Situational Awareness

- Monitor developments (fuel, weather, ATC, etc.).
- Anticipate required actions.
- Ask the right questions.
- Report fatigue, stress, and overload in self and others.

Decision Making (C-L-E-A-R Module)

- CLARIFY the problem
 - LOOK for ideas and share info
 - EVALUATE different solutions
 - ACT on your decisions
 - REVIEW performance
-

Crew Self-Evaluation

- Debrief key events.
 - Continuously provide information to self-correct.
 - Openly discuss successes and mistakes.
 - Ask, “How could we have done better?”.
 - Discuss what is right, not who is right.
-

Critical Phases of Flight (Sterile Flight Deck)

Critical phases of flight are defined as all ground operations from “start-up to shut-down” and all other flight operations conducted below 10,000 ft AFE except cruise flight.

- No crew member shall engage in any activity in the critical phases of flight which could distract the other flight crewmember from the performance of duties. In an emergency and if the situation so warrants the Captain has the authority to deviate from these rules and initiate any action in the interest of safe operations.
 - No person shall enter the flight deck in any phase of flight unless permitted by the Captain.
 - The Seat Belt Sign shall be kept “ON” during the critical phases of flight.
-

Activity prohibited during critical phase of flight :

- reading material not related to proper conduct of flight;
 - paper work not related to safe operation of flight;
 - engaging in nonessential conversation;
 - taking meals;
 - announcements to passengers promoting the airline or pointing out sites of interest;
 - non-operational communication
-

Communication Procedures :

Normally VHF left is used for ATC communications, VHF right to monitor 121.5/ Secondary ATC/Company/ATIS and VHF centre for ACARS/Data link Communications.

The PM will handle ATC communications, record and read back all clearances received. Both Pilots must monitor all ATC clearances. Captain will handle all communications with the ground personnel.

In flight, a listening watch on 121.5 MHz is recommended above FL 290.

Note: The L, C, and R radios shall only be tuned with the associated radio tuning switch.

ATC Procedures :

On ground during taxi, First Officer notes and reads back all clearances and instructions to ATC. Then, announces taxi/progressive taxi instructions. Captain verifies and acknowledges

Example :

ATC : Jet Airways 117 , cleared to cross runway 14
F/O to ATC : Cleared to cross runway 14, Jet Airways 117
F/O : Cleared to cross runway 14
Captain : Checked

Inflight, with Autopilot engaged, PM reads back heading and/or altitude clearances to the ATC. PF verbally states clearances and sets the heading/altitude in the heading/altitude window on the MCP while PM verifies that with ATC instructions and acknowledges.

Example :

ATC : Jet Airways 117, turn right heading 090 and climb FL 100
PM to ATC : Turn right heading 090 and climb FL 100, Jet Airways 117
PF : Makes the input to MCP and states verbally“ Heading 090 , FL 100” “set”
PM : “Checked”

In manual flight, PM reads back heading and/or altitude clearances to ATC, verbally states clearances and sets the heading/altitude in the heading/altitude window on the MCP. PF verifies that with ATC instructions and acknowledges.

Example :

ATC : Jet Airways 117, turn right heading 090 and climb FL 100
PM to ATC : Turn right heading 090 and climb FL 100, Jet Airways 117
 Makes input to MCP and states verbally“ Heading 090, FL 100” “set”
PF : “checked”

Headphone and Flight Deck Speaker Use :

Headphones or boom microphones/headsets are worn during takeoff until the top of climb and from the start of descent throughout approach and landing. During cruise, flight deck speakers may be used. Speaker volume should be kept at the minimum usable level adequate to avoid interference with normal crew flight deck conversation, but still ensure reception of relevant communications.

FMC Initialization with ACARS Uplink :

Jet Airways currently uplinks the Route Winds, Descent Forecast Winds only. Flight Number, Route, PERF INIT and TAKEOFF REF data are NOT uplinked and need to be manually entered by the crew from OFP.

En-Route FMC Winds : Uplinked/Manual :

Wind data through ACARS uplink is the preferred method for reduced workload and better optimization. In case ACARS wind uplink is not received inflight, flight crew can send an ACARS free text message “No Wind Uplink , update Winds” to Company (AGM/BOMXG9W) Flight crew should enter the winds manually in case winds are not uplinked at all.

Note : To uplink the latest wind update, four flight levels, for which the winds are desired, should be entered in the FMC LEGS DATA pages before sending WIND DATA REQUEST. In the absence of flight levels, older wind updates will be uplinked for flight levels stored in the company server computer, sometimes for undesired flight levels. e.g. FL 230 on LHR-BOM route.

Route Verification :

Route verification consists of a basic Airway/Waypoint crosscheck between the OFP and the FMC. There are two recommended OFP pages for route verification.

- OFP ATC Flight Plan; or
- OFP Navigation Log Pages.

This is best done by the two operating crew working together to check FMC against OFP. For this, after the route is manually entered by one pilot, the other pilot reads out the FMC Route entries and the first pilot crosschecks that with OFP Route.

FMC Track / Distance Checking :

Any route segments involving Latitude/Longitude Waypoints / Off Airway Waypoints or Oceanic Space require a Track/Distance crosscheck of FMC LEGS page data with OFP. Minor differences between the magnetic heading and track on

the OFP and the heading or track in the FMC may exist and are acceptable.

Synoptic Display :

Synoptic displays are provided as a means of assisting the flight crew in rapidly understanding the status of the airplane systems. However, crews should not rely solely on the displays for determining airplane status. Synoptic displays should only be used as necessary to get the desired information and then turned off. The clarity and simplicity of displayed information enable the flight crew to obtain necessary information from a brief scan.

If the flight crew elects to use synoptic displays in conjunction with accomplishment of procedures, they must assure no distraction from the intended task results.

Ground Maneuver Camera System (GMCS) :

The GMCS is useful in determining wheel placement when maneuvering and its use is recommended for taxi. The display may be selected as required on any MFD.

It must be switched OFF during takeoff, approach and landing.

TCAS Operation :

The TCAS elevation switch may be selected to ABOVE or BELOW depending on the area to be displayed for traffic. Normally ABOVE during climb and BELOW during cruise and descent.

Terrain Display :

Crews should be aware of terrain that may affect safe operation of the aircraft during all phases of flight. To enhance situational awareness, Terrain may be selected at any time. Terrain is selected on an ND:

Before takeoff :

- PM selects Terrain and retains until above the highest sector MSA.

During descent :

- If not selected earlier, PM selects Terrain when cleared below highest sector MSA.
 - These requirements may be modified with significant weather or if terrain is not a factor.
-

Displays and Instruments :

All display units and flight instruments on the flight are liquid crystal type. The surface has a special coating which requires a special cleaning procedure detailed in the maintenance manual.

Note: DO NOT touch any LCD display, (except the EFB touch screen), with fingers. If cleaning of the displays is required, enter the condition in the Technical Log.

Use of Cancel / Recall Switch :

When the Cancel/Recall Switch is pressed, announce "Recall" then call out the EICAS messages.

E.g. Before Start Procedure, announce:

"Recall. - TCAS off, Engine Shutdown"

If EICAS messages are displayed without being recalled by the Cancel/Recall switch, as in a Non Normal situation, the PM announces the displayed EICAS alert. E.g. "Pack Left"

When all the messages/alerts have been actioned or reviewed, the PF shall ask for the EICAS to be cancelled by calling "CANCEL"

Autopilot Engagement / Disengagement :

The PF requests that the autopilot be engaged by calling "Engage Autopilot. Autopilot can be engaged by PM by pushing the autopilot engage switch on either side of the MCP, however, pushing the autopilot switch on PM side is recommended. This should be followed by calling out the FMA / ASA change i.e. "Autopilot". Prior to disconnecting the autopilot, the PF should make his intention known with a call similar to "manually flying" or "disconnecting" etc. followed by the AFDS status call. "Flight Director "by PM.

Augmented Crew Operations :

Pilot-In-Command shall manage effective and efficient use of the Relief crew. Use of Relief crew should be done in a manner that decreases the workload on the operating crew without introducing opportunities for error, nor reducing the situational awareness of the operating crew.

All pilots shall familiarize themselves with the pre-flight briefing.

At least one relief pilot must be seated on the observer seat for Taxi, Take Off and Landing.

Crew rest will be allocated by the PIC prior to departure in concurrence with other flight crew.

During crew changes the speaker should be on to ensure communications continuity, the autopilot must be engaged and each crew area should be neat and tidy with maps and documents in their standard locations. No flight deck seat changes will be conducted below FL100. The other pilot at controls must maintain high levels of alertness and situational awareness during changeover.

Take off Thrust Policy :

When conditions permit, take off thrust selection is done in the following priority order;

1. Derate 10 plus Assumed Temperature Method
2. Derate 10
3. Assumed Temperature Method
4. Max Thrust

The Take off thrust selection on EFB OPT Take off module and the THRUST LIM page of FMC CDU must be identical.

Electronic Flight Bag :

Note: Crews must avoid fixation on the display or distraction from primary crew duties while using any EFB application. Use of base keys (manipulating line select keys) is recommended over touch screen where possible to avoid loss of calibration.

Airport Moving Map :

The airport map display is intended to enhance crew positional awareness while planning taxi routes and while taxiing. The system is not intended to replace normal taxi methods including the use of direct visual observation of the taxiways, runways, airport signs and markings and other airport traffic. Prior to taxi, NOTAMS and airport charts (using EFB terminal charts or paper) should be consulted for the latest airport status to include closed taxiways, runways, construction, etc., since these temporary conditions are not shown on the airport map.

Crews must use direct visual observation from flight deck windows as the primary taxi navigation reference. Use the airport Heading-Up or North-Up map to provide enhanced positional awareness by:

- verifying taxi clearance and assisting in determining taxi plan (both pilots)
- monitoring taxi progress and direction (both pilots)
- alerting and updating the pilot taxiing with present position and upcoming turns and required stops (pilot not taxiing).

In flight, the airport North-Up fixed map may be used to aid in runway exit planning and anticipating the taxi route to the gate or parking spot.

If one airport map display is inoperative at dispatch, the crewmember with the inoperative display may wish to keep a paper copy of the airport diagram readily available. During taxi in this situation, one pilot should continue to use the airport map display for positional awareness while the other pilot monitors progress on the paper chart. If an airport map display fails after dispatch and no paper backup airport diagrams are available, the crew should consider having the pilot not taxiing provide progressive taxi and positional updates to the pilot taxiing or request progressive taxi instruction from ground control. In any case, the pilot taxiing should always devote primary attention to taxiing the airplane by external visual observation. If the airport map display is inoperative on both sides, use normal taxi procedures.

Note: GPS position must be available to use the Heading-Up map.

Terminal Charts:

Electronic terminal charts may be used in place of paper charts. Should the airplane dispatch with one or both displays inoperative, the crew should comply with the provisions of the MEL regarding the use of backup charts.

Airplane Performance:

When all appropriate entries are made, the airplane performance application provides runway specific performance information equivalent to AFM-DPI data or airline airport analysis. During approach preparation, the system can provide advisory landing distance information.

Video Surveillance:

The video surveillance display may be used at the discretion of the crew to identify individuals requesting flight deck entry or for other airline-specific purposes such as monitoring R 1 Galley and L1 passenger entry door area leading to the flight deck..

Document:

The EFB Documents may be referred by crew as and when required. The crew must ensure valid database selection.

Extending the Centerline :

When being radar vectored for an approach extend the centerline prior to intercepting finals.

This Provides :-

- a simplified navigation display.
- a display of distance remaining to the appropriate fix.
- a depiction of x-track error from the final approach course.
- LNAV capability during the missed approach procedure.

If you are vectored inside the fix from which the centerline was extended, re-extend the centerline from the next fix ahead.

Do not extend the centerline for RNAV approach and when LNAV is engaged and cleared to fly a transition to the approach or if cleared from holding at a fix that is part of the approach.

Visual Approach and Landing Considerations:

FMS/ND Utilization

- Using the FMS during visual approaches is recommended
 - Program the landing runway as the active waypoint.
 - With ND in 10 mile scale, turn to base leg when runway symbol disappears (approximately 4-5 NM from approach end of runway)
 - Use distance remaining from runway (if active waypoint) and runway elevation to determine 3 to 1 descent profile.
 - Green arc may be used to monitor descent rate.
 - Vertical speed or FPM may be utilized for normal descent rate.
-

ILS Precision Runway Monitor (PRM) Approach - Break out Procedures

Note: All “Break outs” must be hand flown.

If ATC calls “Traffic Alert” during the PRM approach:

A/P Disengage PF

F/D (both) OFF PM

Maneuver as directed by ATC PF

If descending, vertical speed should not exceed 1,000 fpm.

F/D (both) ON PM

The PM will select the Hdg Sel as the roll mode and will engage V/S as the pitch mode with a Rate of Descent/Climb of 1000 fpm.

Note: If ATC “Break out” instructions coincide with a TCAS RA, follow the vertical guidance of the RA and the lateral guidance directed by ATC.

When “break out” complete:

Reset Automation to the appropriate level.

Normal Procedures**Briefings****Briefings :**

This chapter contains following ‘Briefings’ ;

1. Cabin Crew Briefing
2. Departure Briefing
3. Cruise Briefing
4. Crew Hand-Over Briefing
5. Approach Briefing

Each Briefing guide provides a list of items in table format, which should be considered for review. The objective is to provide the crew with concise, factual information relative to the flight, and to highlight certain areas of importance. There may be additional special issues pertaining to a flight that, though not specifically listed, should nevertheless be addressed. If any item is “not applicable” or “not an issue”, then it need not be specifically addressed in the briefings. The briefings should help both the PF (giving the briefing) and the PM (receiving and acknowledging the briefing) to understand the sequence of events and actions, as well as the special hazards and circumstances. While conducting the briefings, flight crew are encouraged to refer to respective briefing tables for review of items in a uniform and standard manner. This may be done by opening the related briefing table on the EFB screen.

Cabin Crew Briefing :

A flight crew member, preferably Pilot-In-Command receives cabin status report from the IFS and briefs on following recommended points :

Flight Details	Flight time, Expected delays, if any
“Cabin Ready” Check on EICAS	Expected time for the check is 12 to 14 min. Brief, in case of short taxi.,
Weather	Enroute wx/Turbulence/Seat belt signs etc
Flight Deck Entry Procedure	Brief
Procedure in case of Reject Take Off/Evacuation *	Review
Refueling while boarding pax.	Brief whether refuelling will take place during boarding
Carriage of Dangerous Goods	Brief and review Emergency Response Drill
Any other item(s) mandated by P-I-C	Review/ Brief

* Standard PA Calls for RTO and Evacuation

In case of a RTO after initial RTO actions are complete and the airplane comes to a stop, the call from the flight deck by the First Officer will be: “CABIN CREW AT STATIONS”.

The Captain will then assess the situation and decide whether evacuation is required. In case an evacuation is required, the call from the Captain would be:

“This is the captain speaking” “EVACUATE EVACUATE EVACUATE”

If evacuation is not required, the call from the Captain would be:

“NORMAL OPERATIONS”

Departure Briefing - PF

The Departure briefing shall be completed as soon as practicable, so as not to interfere with the final takeoff preparation. The briefing shall include the following:

EFB OPT TAKE OFF DATA	Review ATIS & Read out Take off Data inputs. PM verifies that same data is input on his/her OPT
TAXI*	Expected Taxi Route & Holding Point NOTAMS if any.
SID	Chart Briefing, FMC & MCP Settings NADP, if any.
REJECT TAKE OFF	Review Procedure
EVACUATION	Review Procedure
ENGINE FAILURE AFTER V1	Review Procedure, Thrust management in case of Derate Take Off. Special EO.
AIR TURN BACK	Discuss strategy vis a vis fuel Jettison/ Overweight Ldg. Checklist

Additional briefing items may be required when applicable. These may include:

ADVERSE WEATHER	LVP Taxi , LVTO if required , Anti-ice use Review Windshear Recovery
MEL/CDL	Effect on Operation of the Flight
DGR/ PERISHABLE CARGO	ERG Brief, Cargo Compartment Temp. setting
OBSERVER BRIEFING	Task sharing during normal and non normal operations

* ALL OUR 777s FALL UNDER AIRPORT REFERENCE CODE E. Check airport limitations.

Cruise Briefing - PF

PF conducts a Cruise Briefing :

1. Upon reaching cruising level
2. Before entering Decompression /ETOPS/Oceanic Segments
3. As and when necessary

-covering the following aspects, as applicable but not limited to:

Strategy Incase of Engine Failure	<ol style="list-style-type: none"> 1. Preferred diversion airfield(s) 2. Drift Down altitude/ Speed 3. MSA, MORA/GRID MORA 4. ETOPS Entry/Exits/Alternates
Strategy Incase of Cabin Depressurization	<ol style="list-style-type: none"> 1. Review memory items 2. Speed Strategy 3. Escape Route, if applicable 4. MSA, MORA, GRID MORA
ATC Procedures	<ol style="list-style-type: none"> 1. Fir Entry Procedures 2. Bobcat 3. CPDLC/HF

Crew Hand-over Briefing - (Situational Awareness Briefing) :

The outgoing crew will conduct a briefing as part of the hand-over process to the incoming crew on augmented operations. The content of the briefing will vary depending on the circumstances of the flight, but the following points should be considered.

Aircraft	<ol style="list-style-type: none"> 1. Position 2. OFP Fuel/Time Progress 3. Nearest/Preferred Alternate 4. Technical Status
ATC	<ol style="list-style-type: none"> 1. Current VHF/HF usage 2. Speed/Altitude Requirements 3. Route Offsets / Oceanic Clearances 4. FIR Freq. Changes 5. CPDLC/ADS Status 6. Outstanding ATC Requests
Route	<ol style="list-style-type: none"> 1. Significant Terrain/Escapes routes 2. Deviation due to WX, SLOP 3. ETOPS Entry/Exit points
Weather	<ol style="list-style-type: none"> 1. Enroute WX 2. Updated Destination/Alternate WX 3. FMC Wind Uplink-Pending Requests
Cabin	<ol style="list-style-type: none"> 1. Any significant cabin events
Other	<ol style="list-style-type: none"> 1. Company messages etc.

Approach Briefing - PF

The briefing shall include the following:

EFB OPT Landing Data	Review ATIS ,Read out Landing Data inputs. PM verifies corresponding data on his/her OPT. Read out 'Landing Distance Required' 'Landing Distance available' and Vspeeds **
Star	Chart Briefing, FMC & MCP Settings
Instrument Approach	Chart Briefing, FMC & MCP Settings
Taxi*	Review expected Taxi Route to parking stand
Alternate Airport	MDF, Holding fuel, Wx, FMC settings
Windshear / Stall Recovery	Review
Go-around Procedure	Review

Additional briefing items may be required when any elements of arrival and/or landing are different from those routinely used. These may include:

Adverse Weather	Use of Anti-ice/Wipers/External Lights , LVP Taxi
MEL/CDL	Effect on Operation of the Flight
Notams	Affecting Approach ,Landing and Taxi Phases
Observer Briefing	Task sharing during normal and non-normal ops.
Special Engine-out Escape Procedures / Terrain	Review

***ALL OUR 777s FALL UNDER TAXI CODE E. Check airport limitations for code E A/C.**

****Note:** Landing Distance displayed by EFB OPT includes a safety margin of 15% on the actual Landing Distance with both thrust reversers credit.

QRH advisory data does not have 15% margin and in case of any discrepancy, the QRH data takes precedence.

Note : Crew qualification, on board equipment requirements, ground based equipment requirements should be considered for the type of approach to be used. Condition of runway intended to be used should not prevent a safe landing.

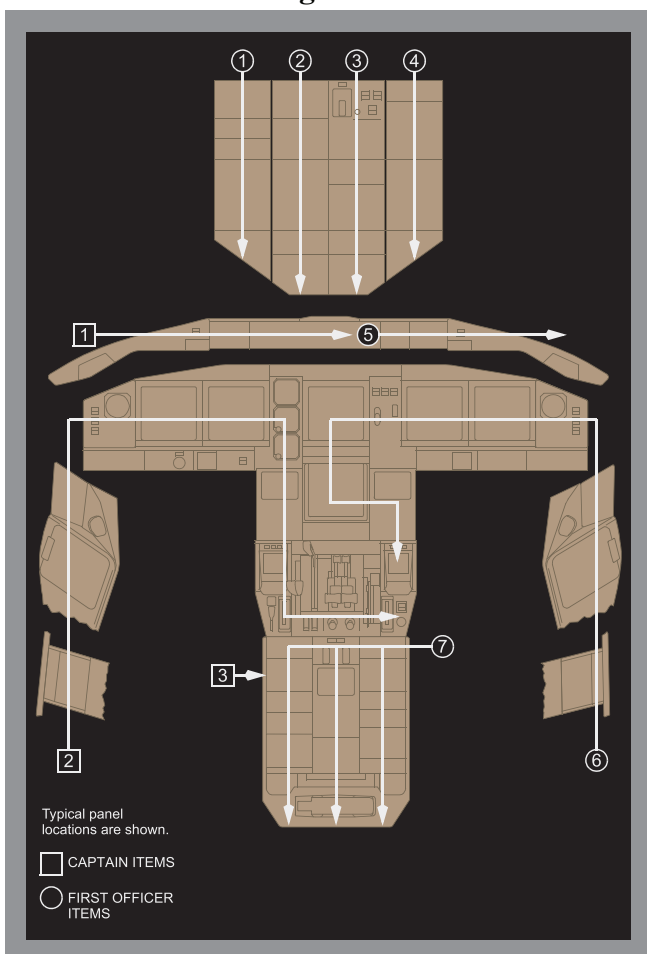
Normal Procedures

Preflight and Postflight Scan Flow

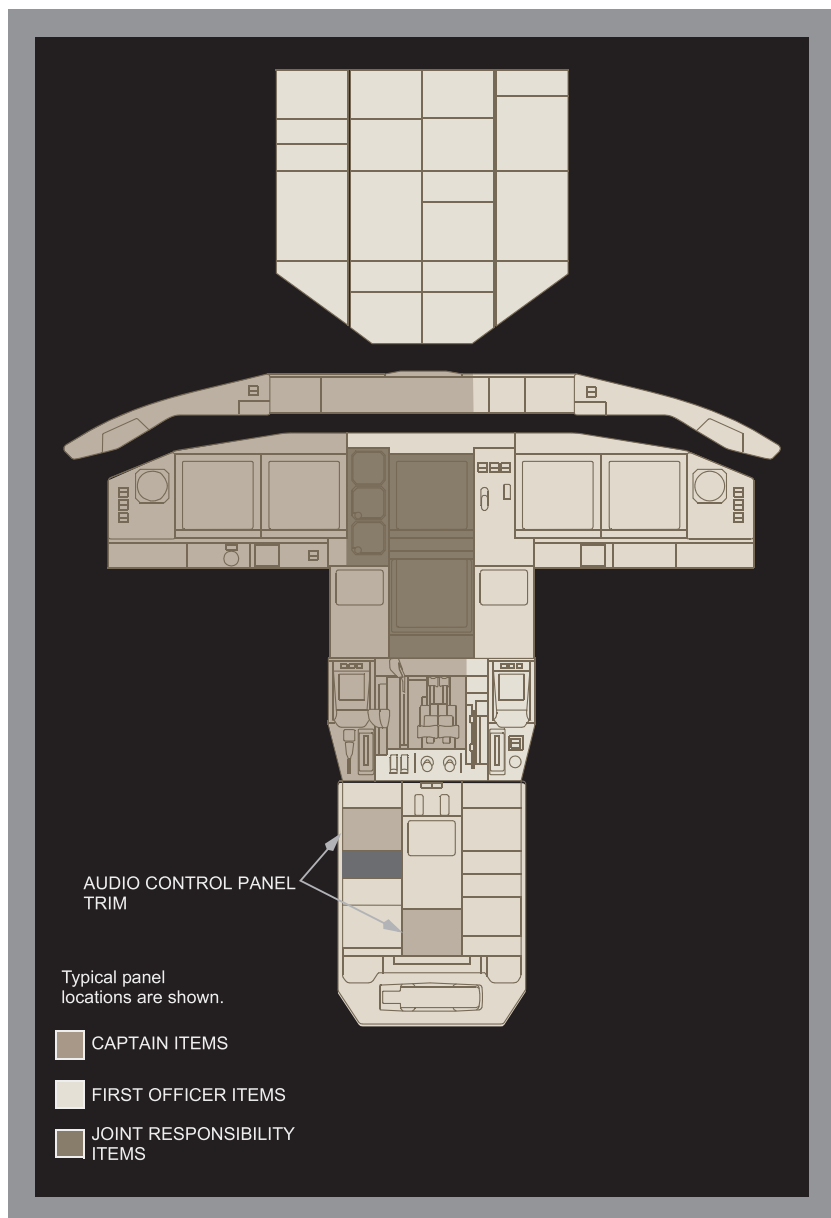
Preflight and Postflight Scan Flow :

The scan flow diagram provides general guidance on the order each flight crew member should follow when doing the preflight and post flight procedures. Specific guidance on the items to be checked is detailed in the amplified Normal Procedures. For example, preflight procedure details are in the Preflight Procedure - Captain and Preflight Procedure - First Officer

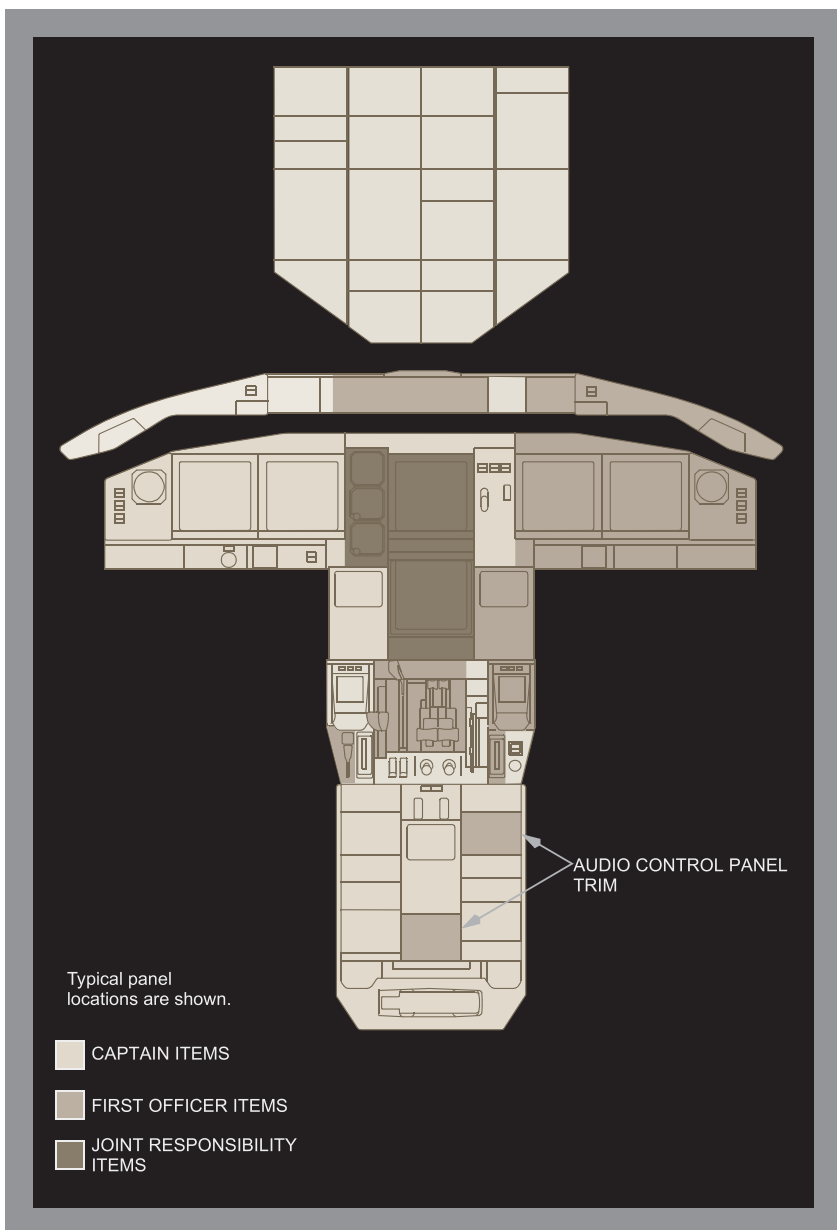
Pre-flight Scan



Areas of Responsibility- Captain as Pilot Flying



Areas of Responsibility - First Officer as Pilot Flying





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Normal Procedures

Amplified Procedures

Amplified Procedures

Preliminary Preflight Procedure

The following procedures are accomplished in their entirety on each originating flight, crew change, transit stop, or following maintenance action.

The Preliminary Preflight Procedure assumes that the Electrical Power Up Supplementary procedure is complete.

WARNING : If an Out-of-Service tag is installed, personnel are not to activate any system, control, switch, or circuit breaker without obtaining approval of Maintenance personnel (preferably the AME actually performing the repairs).

ADIRU switch OFF 30 seconds, then ON F/O

Verify that the ON BAT light is extinguished. Verify that the OFF light is extinguished.

Voice Recorder switch ON F/O

Status display Check F/O

Verify that only expected messages are shown. Verify that the following are sufficient for flight:

- oxygen pressure (minimum 945 psi for 4 crew operation)
- hydraulic quantity (no RF displayed)
- engine oil quantity (minimum 20 units)

Tech Log Check C, F/O

- Check the aircraft Technical Log book to become familiar with the history and maintenance status of the aircraft and any defects logged.
- Ensure the Airworthiness Release has been signed by maintenance.
- Carried Forward Snags should be reviewed, using the MEL/DDPG, to ensure compliance when special operating procedures are applicable.

Carriage of all mandatory documents Check C, F/O

(Ref : 8.1.12 OM PART A)

Flight Deck Access System switch Test F/O

(Ref: FCOM VOL 1 SP page 1.2)

Guard UP Switch UP	F/O	
Flight Deck Emergency equipment	Check	F/O
Fire Extinguisher	Checked and stowed	F/O
Check needle in green band and trigger safety pin in place properly stowed.		
Crash axe	Stowed	F/O
Escape ropes	Stowed	F/O
PBE	Checked and stowed	F/O
Life Vests	Stowed	F/O
Overhead maintenance panel	Guards closed	F/O
Verify that all lights are extinguished.		
CARGO TEMPERATURE selectors -	As required	F/O
Circuit breakers	Check	F/O
Flight Crew Rest (FCR)	Check	F/O
Check smoke detectors showing green light.		
Check no unidentified objects		
Check general cleanliness/Seat belt/lights off/heater off.		
Parking brake	Set	C

Set the Park Brake if brake wear indicators will be checked during the exterior inspection.

Preflight CDU Procedure - Pilot Flying :

Start the CDU preflight procedure anytime after the Preliminary Preflight Procedure. The Initial Data and Navigation Data entries must be complete before the flight instrument check during the Preflight Procedure.

This procedure is accomplished by the Pilot Flying (PF). In this case the Pilot Monitoring (PM) does the Exterior Inspection. However the Captain may use his discretion to delegate duties.

Enter data in all the boxed items on the following CDU pages.

Enter data in the dashed items or modify small font items that are listed in this procedure. Enter or modify other items at pilot's discretion.

Enter average top of climb wind and step climb altitudes from OFP

Failure to enter enroute winds can result in flight plan time and fuel burn errors. Jet Airways Ground system is set up to send Wind uplink after airborne plus 5 minutes.

ATIS or Weather Data Check

Initial Data Set

IDENT page:

Verify that the MODEL is correct.

Verify that the ENG RATING is correct.

Verify that the navigation data base ACTIVE date range is current.

Drag Factor at 0.0

Fuel Flow Factor as stated on the OFP

POS INIT page:

Verify that the UTC time is correct.

Enter REF AIRPORT.

Enter the GPS position on the SET INERTIAL POS line.

If GPS position not available:

The gate position if loaded in the FMC or, if not available, manually enter position from the airport chart.

Navigation Data Set

RTE page:

Enter "JAI" then FLIGHT NUMBER as per ATC flight plan.

Enter the route. If available use COMPANY ROUTE.

Activate and execute the route.

DEPARTURES page:

Select the runway and departure routing.

Execute the runway and departure routing.

Verify that the route is correct on the RTE page. Check the LEGS pages as needed to ensure compliance with the flight plan.

Verify or enter the correct RNP for the departure (if required).

NAV RADIO page:

Tune the navigation radios as required.

Performance Data. Set

PERF INIT page:

CAUTION: Do not enter the ZFW into the GR WT boxes. The FMC will calculate performance data with significant errors.

Zero Fuel Weight Enter

If refueling is complete:

Verify that the FUEL on the CDU, the CFP, and the EICAS agree.

Verify that the fuel is sufficient for flight.

Enter Reserves

Enter CRZ ALT

Enter COST INDEX

Enter STEP SIZE according to airspace system, Valid entries are:

- "0" to inhibit predicted step climbs, or
- altitudes from 1000 to 9900 in 100 foot increments, or
- "I" for ICAO, or
- "R" for RVSM

Takeoff Ref. pages:

Make data entries on page 2/2 before page 1/2.

Enter ACCEL HT according to noise abatement procedure.

Enter EO ACCEL HT.

Enter THR REDUCTION height.



B777 Standard Operating Procedures

Note: Entry of RWY WIND/SLOPE/CONDITION/POS is optional as EFB output take off speeds will be entered in FMC.

Go to TAKEOFF page 1

Verify REF speed ON.

LEGS/ROUTE DATA/WIND pages:

Enter expected/desired Step Climb FL/Altitudes , against 1st cruise waypoint in RTE DATA.

Enter initial Cruise FL/temperature and

Enter Average winds for all Step FL/Altitudes.

RTE page:

Select RTE COPY

VNAV CLB page:.

Verify TRANS ALT.

FIX INFO pages: :

Enter appropriate data as required.

Exterior inspection :

Before each flight a flight crew member must verify that the airplane is satisfactory for flight. When conducting exterior inspection flight crew must wear the high visibility jacket.

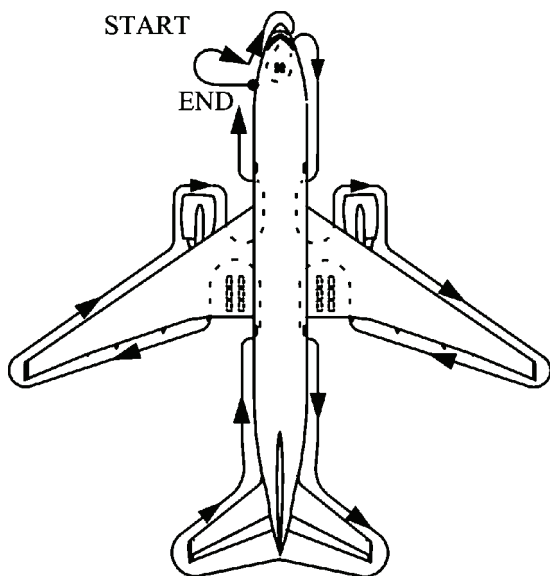
Items at each location may be checked in any sequence.

Use the detailed inspection route below to check that:

- the surfaces and structures are clear, not damaged, no missing parts and there are no fluid leaks
- the tires are not too worn, not damaged, and there is no tread separation
- the gear struts are not fully compressed
- the engine inlets and tailpipes are clear, the access panels are secured, the exterior is not damaged, and the reversers are stowed
- the doors and access panels that are not in use are latched
- the probes, vents, and static ports are clear and not damaged
- the skin area adjacent to the pitot probes and static ports is not wrinkled
- the antennae are not damaged
- the light lenses are clean and not damaged

For cold weather operations see the Supplementary Procedures

Inspection Route



Left Forward Fuselage :

Probes, sensors, ports, vents, and drains (as applicable) Check
 Doors and access panels (not in use) Latched
 Oxygen pressure relief green disc In place
 Forward outflow valve Check

Nose

Radome Check

Diverter strips - Secure

Forward access door Secure

Nose Wheel Well

Tires and wheels Check
 Gear strut and doors Check
 Nose wheel steering assembly Check
 Gear pin As needed
 Nose gear towing lever NORMAL
 Nose gear towing lever pin Verify removed
 Exterior lights Check
 Wheel well light switches As needed
 Forward E and E door Secure

Right Forward Fuselage

Probes, sensors, ports, vents, and drains (as applicable) Check
 Doors and access panels (not in use) Latched
 Negative pressure relief vents Closed

Right Wing Root, Pack, and Lower Fuselage

Probes, sensors, ports, vents, and drains (as applicable) Check
 Exterior lights Check
 Pack inlet and pneumatic access doors Secure
 Leading edge flaps Check

Right Engine

Access panels Latched
 Probes, sensors, ports, vents, and drains (as applicable) Check

Fan blades, probes, and spinner Check
 Thrust reverser Stowed
 Exhaust area and tailcone Check

Right Wing and Leading Edge

Access panels Latched
 Leading edge slats Check
 Fuel measuring sticks Flush and secure
 Wing Surfaces Check
 Fuel tank vent Check

Right Wing Tip and Trailing Edge

Navigation and strobe lights Check
 Static discharge wicks Check
 Fuel jettison nozzle Check
 Aileron flaperon, and trailing edge flaps Check

Right Main Gear

Tires, brakes and wheels Check
 Verify that the wheel chocks are in place as needed.
 If the parking brake is set, the brake wear indicator pins must extend out of the guides.

Gear strut, actuators, and doors Check
 Hydraulic lines Secure
 Gear pins As needed

Right Main Wheel Well

Wheel well Check

Right Aft Fuselage

Ram air turbine door Check
 Doors and access panels (not in use) Latched
 Probes, sensors, ports, vents, and drains (as applicable) Check

Tail

Vertical stabilizer and rudder Check
 Tail skid Check

Verify that the tail skid is not damaged.

Horizontal stabilizer and elevator Check

Static discharge wicks Check

Strobe light Check

APU exhaust outlet Check

Left Aft Fuselage

Aft outflow valve Check

Doors and access panels (not in use) Latched

Probes, sensors, ports, vents, and drains (as applicable) Check

Left Main Wheel Well

Wheel well Check.

Left Main Gear

Tires, brakes and wheels Check

Verify that the wheel chocks are in place as needed.

If the parking brake is set, the brake wear indicator pins must extend out of the guides.

Gear strut, actuators and doors Check

Hydraulic lines Secure

Gear pins As needed

Left Wing Tip and Trailing Edge

Navigation and strobe lights Check

Static discharge wicks Check

Aileron, flap, and trailing edge flaps Check

Fuel jettison nozzle Check

Fuel tank vent Check

Left Wing and Leading Edge

Wing Surfaces Check

Fuel measuring sticks Flush and secure

Fuel tank vent Check

Leading edge slats Check

Access panels Latched



B777 Standard Operating Procedures

Left Engine

Exhaust area and tailcone	Check
Thrust reverser	Stowed
Probes, sensors, ports, vents, and drains (as applicable)	Check
Access panels	Latched
Fan blades, probes, and spinner	Check

Left Wing Root, Pack, and Lower Fuselage

Probes, sensors, ports, vents, and drains (as applicable)	Check
Exterior lights	Check
Pack inlet and pneumatic access doors	Secure
Negative pressure relief vents	Closed
Positive pressure relief valves	Closed
Leading edge flaps	Check

Preflight Procedure - First Officer :

The following procedures are accomplished in their entirety on each originating flight, crew change, transit stop, or following maintenance action. This procedure is accomplished by the F/O.

WARNING: If a MAINT tag is installed, flightcrew are not to activate any system, control, switch, or circuit breaker without obtaining approval of Maintenance personnel (preferably the AME actually performing the repairs).

THRUST ASYMMETRY COMPENSATION

switch AUTO

Verify that the OFF light is extinguished.

PRIMARY FLIGHT COMPUTERS

DISCONNECT switch Guard closed

Verify that the DISC light is extinguished.

ELECTRICAL panel Set

BATTERY switch ON

Verify that the OFF light is extinguished.

IFE/PASS SEATS power switch ON

Verify that the OFF light is extinguished.

CABIN/UTILITY power switch ON

Verify that the OFF light is extinguished.

APU GENERATOR switch ON

Verify that the OFF light is extinguished.

BUS TIE switches AUTO

Verify that the ISLN lights are extinguished.

GENERATOR CONTROL switches ON

Verify that the OFF lights are illuminated.

Verify that the DRIVE lights are illuminated.

BACKUP GENERATOR switches ON

The OFF lights stay illuminated until the respective engine is started.

APU selector (as required) START, then ON

Do not allow the APU selector to spring back to the ON position.

Verify that the FAULT light is extinguished.

CAMERA LIGHTS switch As required

L WIPER selector OFF

ELT switch Guard closed

EMERGENCY LIGHTS switch Guard closed

SERVICE INTERPHONE switch OFF

PASSENGER OXYGEN ON light Verify extinguished

Note: Do not push the PASSENGER OXYGEN switch. The switch causes deployment of the passenger oxygen masks.

WINDOW HEAT switches ON

Verify that the INOP lights are extinguished.

RAM AIR TURBINE UNLOCKED light Verify extinguished

WARNING: Do not push the RAM AIR TURBINE switch. The : switch causes deployment of the ram air turbine. :

HYDRAULIC panel Set

LEFT and RIGHT ENGINE PRIMARY pump switches ON

Verify that the FAULT lights are illuminated.

Center 1 and Center 2 ELECTRIC PRIMARY pump switches OFF

Verify that the FAULT lights are illuminated.

DEMAND pump selectors OFF

Verify that the FAULT lights are illuminated.

PASSENGER SIGNS panel Set

NO SMOKING selector ON

SEAT BELTS selector OFF or ON

Note : During refueling with pax on board , the SEAT BELT selector should be Positioned OFF.

Lighting panel Set

OVERHEAD panel light control Mid position

CIRCUIT BREAKER panel light control Mid position

DOME light control As required

STORM light switch	As required
MASTER BRIGHTNESS switch	ON
MASTER BRIGHTNESS control	As required
GLARESHIELD PANEL/FLOOD light control	Mid position
LANDING light switches	OFF
APU fire panel	Set
Verify that the APU BTL DISCH light is extinguished.	
APU fire switch	In
Verify that the APU fire warning light is extinguished.	
CARGO FIRE panel	Set
CARGO FIRE ARM switches	OFF
Verify that the FWD and AFT fire warning lights are extinguished.	
Verify that the cargo fire DISCH light is extinguished.	
ENGINE panel	Set
EEC MODE switches	NORM
START selectors	NORM
AUTOSTART switch	ON
Verify that the OFF light is extinguished.	
FUEL JETTISON panel	Set
FUEL JETTISON NOZZLE switches	OFF
Verify that the VALVE lights are extinguished.	
FUEL TO REMAIN selector	IN
FUEL JETTISON ARM switch	OFF
Verify that the FAULT light is extinguished.	
FUEL panel	Set
Ensure fueling is in progress or complete.	
CROSSFEED switches	OFF
Verify that the VALVE lights are extinguished.	
FUEL PUMP switches	OFF
Verify that the left forward pump PRESS light is extinguished if the APU is on or is illuminated if the APU is off.	

Verify that the other left and right pump PRESS lights are illuminated.

Verify that the center pump PRESS lights are extinguished.

p>ANTI-ICE Panel Set
WING anti-ice selector AUTO
ENGINE anti-ice selectors AUTO
Lighting panel Set
BEACON light switch OFF
NAVIGATION light switch ON
LOGO light switch ON during night operation
WING light switch OFF
INDICATOR LIGHTS switch As required
RUNWAY TURNOFF light switches OFF
TAXI light switch OFF
STROBE light switch OFF
FORWARD CARGO AIR CONDITIONING As needed
AIR CONDITIONING panel Set
EQUIPMENT COOLING switch AUTO

Verify that the OVRD light is extinguished.

p>GASPER switch ON
RECIRCULATION FANS switches ON
FLIGHT DECK TEMPERATURE control Mid AUTO position
CABIN TEMPERATURE control Mid position
PACK switches AUTO

Verify that the OFF lights are extinguished.

TRIM AIR switches ON

Verify that the FAULT lights are extinguished.

p>BLEED AIR panel Set
LEFT, CENTER and RIGHT ISOLATION switches AUTO

Verify that the CLOSED lights are extinguished.

ENGINE bleed switches ON

The OFF lights stay illuminated until the respective engine is started.

APU bleed switch	AUTO
Verify that the OFF light is extinguished.	
PRESSURIZATION panel	Set
OUTFLOW VALVE switches	AUTO
Verify that the MAN lights are extinguished.	
LANDING ALTITUDE selector	IN
R WIPER selector	OFF
FLIGHT DIRECTOR switch	ON
Display select panel	Set
LOWER CENTER display switch	PUSH
EFIS control panel	Set
MINIMUMS reference selector	RADIO or BARO
MINIMUMS selector	Minimum shall be blank
FLIGHT PATH VECTOR switch	shall be blank
METERS switch	shall be blank
(except when information in meters is required)	
BAROMETRIC reference selector	IN or HPA
BAROMETRIC selector	Set local altimeter setting
VOR/ADF switches	As needed
ND mode selector	MAP
ND CENTER switch	Select expanded display
ND range selector	Set
<ul style="list-style-type: none"> • 10 NM range as PF • 20 NM range as PM 	
ND TRAFFIC switch	Select ON
WEATHER RADAR	Off
Verify that the weather radar indications are not shown on the ND	
Map switches	As needed
Oxygen	Test and set
Oxygen mask	Stowed and closed
RESET/TEST switch	Push and hold

Verify that the yellow cross shows momentarily in the flow indicator.

RESET/TEST switch Release

Turn Regulator to EMER Push and hold RESET/TEST switch

Verify that the yellow cross shows continuously in the flow indicator.

RESET/TEST switch Release

Verify that the yellow cross does not show in the flow indicator.

Normal/100% selector 100%

Crew oxygen pressure Check EICAS

Verify that the pressure is sufficient for dispatch.

ELECTRONIC FLIGHT BAG Set

PWR switch - Push

Adjust display brightness.

MENU key - Push

On the MAIN MENU page:

Select INITIALIZE FLIGHT button

Check/ Clear/ Acknowledge all FAULT, MEMO, MSG items displayed.

Check Video surveillance operation

FORWARD PANEL BRIGHTNESS controls Mid position

Instrument source select panel Set

NAVIGATION source switch OFF

DISPLAY CONTROL source switch OFF

AIR DATA/ATT source switch OFF

Clock Set

Time/date selector UTC

INBOARD DISPLAY selector MFD

FMC Selector AUTO

Do the Initial Data and Navigation Data steps from the CDU Preflight Procedure and verify that the IRS alignment is complete before checking the flight instruments.

Flight instruments Check

Verify that the flight instrument indications are correct.

Verify that only these flags are shown:

- TCAS OFF
- NO VSPD until takeoff V-speeds are selected

Verify that the flight mode annunciations are correct:

- autothrottle mode is blank
- roll mode is TO/GA
- pitch mode is TO/GA
- AFDS status is FLT DIR

Select the map mode.

Landing gear panel Set

Verify that the GND PROX light is extinguished.

FLAP OVERRIDE switch OFF

GEAR OVERRIDE switch OFF

TERRAIN OVERRIDE switch OFF

Landing gear lever DN

ALTERNATE GEAR switch Guard closed

AUTOBRAKE selector RTO

EICAS display Check

Verify that the primary engine indications show existing conditions.

Verify that no exceedance is shown.

MFD Check

Secondary ENGINE indications Check

Verify that the secondary engine indications show existing conditions.

Verify that no exceedance is shown.

STATUS display switch Push

Check status messages

CHECKLIST display switch Push

LOWER CENTER cursor location switch Push

Verify that the lower center cursor location light is illuminated.

RESETS Select

RESET ALL Select

ACARS INITIALIZATION

Once the FMC Initialization is complete, the ACARS Initialization can be completed. Crew can access ACARS through any MFD.

- COMMUNICATION display switch Push
- MANAGER Select
- DATA LINK SYSTEM RESET Select
- CONFIRM RESET Select
- COMPANY Select
- REQUEST AUTO INITIALIZATION Select
- Verify Flight Number and Date Send
- Synoptic DOOR switch Push
- Center DISPLAY CONTROL source switch Off
- CENTER PANEL BRIGHTNESS controls Mid position
- Left radio tuning panel Set
 - Select VHF L and verify that the OFF light is extinguished.
- WEATHER RADAR panel Set
- Center radio tuning panel Set
 - Select VHF C, verify DATA displayed and that the OFF light is extinguished.
- Observer audio control panel As needed
- Flight deck door panel As needed
- Engine fire panelSet
 - Verify that the ENG BTL 1 DISCH and ENG BTL 2 DISCH lights are extinguished.
- Engine fire switches In
 - Verify that the LEFT and RIGHT fire warning lights are extinguished.
- Center CDUSet
 - Set cabin interphone main menu page.
- Flight deck printerSet
 - Verify that the PAPER light is extinguished.
- Right radio tuning panelSet

Select VHF R and verify that the OFF light is extinguished.

First Officer audio control panel As needed

Transponder panel Set

Transponder mode selector STBY

Transponder selector L or R alternating

Transponder code window set 2000

FLOOR LIGHTS switch As needed

OBSERVER AUDIO selector NORM

AISLE STAND PANEL light control Mid position

AISLE STAND FLOOD light control Mid position

WARNING: Do not put objects between the seat and the aisle stand Injury can occur when the seat is adjusted.

Seat Adjust

Adjust the seat for optimum eye reference.

Rudder pedals Adjust

Adjust the rudder pedals to allow full rudder pedal and brake pedal movement. Stow the rudder pedal adjust crank.

Seat belt and shoulder harness Adjust

Flight deck windows Closed and locked C, F/O

Verify that the WINDOW NOT CLOSED decal does not show.

Do the **PREFLIGHT checklist** on the Captain's command.

Preflight Procedure - Captain:

The following procedures are accomplished in their entirety on each originating flight, crew change, transit stop, or following maintenance action.

This procedure is accomplished by the Captain.

EFIS control panel Set
 MINIMUMS reference selector RADIO or BARO
 MINIMUMS selector Minimum shall be blank
 FLIGHT PATH VECTOR switch shall be blank
 METERS switch shall be blank
 (except when information in meters is required)
 BAROMETRIC reference selector IN or HPA
 BAROMETRIC selector Set local altimeter setting
 VOR/ADF switches As needed
 ND mode selector MAP
 ND CENTER switch Select expanded display
 ND range selector Set

- 10 NM range as PF
- 20 NM range as PM

ND TRAFFIC switch ON
 TCAS OFF will display on NDs until TCAS is set to TA or TA/RA.
 WEATHER RADAR Off
 Verify that the weather radar indications are not shown on the ND.
 Map switches As needed
 Mode control panel Set

 FLIGHT DIRECTOR switch – ON
 AUTOTHROTTLE ARM switches – ARM
 Autopilot DISENGAGE bar – UP
 HEADING/TRACK reference switch – As needed
 BANK LIMIT selector – AUTO
 VERTICAL SPEED/FLIGHT PATH ANGLE reference switch – As needed

ALTITUDE increment selector – As needed

Oxygen Test and set

Oxygen mask – Stowed and doors closed

RESET/TEST switch – Push and hold

Verify that the yellow cross shows momentarily in the flow indicator.

EMERGENCY/TEST selector – Push and hold

Continue to hold the RESET/TEST switch down and push the

EMERGENCY/TEST selector.

Verify that the yellow cross shows continuously in the flow indicator.

RESET/TEST switch and EMERGENCY/TEST selector – Release

Verify the yellow cross does not show in the flow indicator.

Normal/100% selector – 100%

ELECTRONIC FLIGHT BAG Set

PWR switch - Push

Adjust display brightness.

MENU key - Push

On the MAIN MENU page:

Select INITIALIZE FLIGHT button

Check/Clear/Acknowledge all FAULT, MEMO, MSG items displayed.

FORWARD PANEL BRIGHTNESS controls Mid position

Instrument source select panel Set

NAVIGATION source switch – Off

DISPLAY CONTROL source switch – Off

AIR DATA/ATTITUDE source switch – Off

Clock Set

Time/date selector – UTC

INBOARD DISPLAY selector MFD

HEADING REFERENCE switch NORM

Do the Initial Data and Navigation Data steps from the CDU Preflight Procedure and verify that the IRS alignment is complete before checking the flight instruments.

Flight instruments Check

Verify that the flight instrument indications are correct.

Verify that only these flags are shown:

- TCAS OFF
- NO VSPD until takeoff V-speeds are selected

Verify that the flight mode annunciations are correct:

- autothrottle mode is blank
- roll mode is TO/GA
- pitch mode is TO/GA
- AFDS status is FLT DIR

Select the map mode.

Integrated standby flight display Set

Verify that the approach mode display is blank

Set local altimeter setting.

Verify that the flight instrument indications are correct.

Verify that no flags or messages are shown.

ALTERNATE PITCH TRIM levers Neutral

SPEEDBRAKE lever DOWN

Reverse thrust levers Down

Forward thrust levers Closed

Flap lever Set

The flap position indicator does not show when the flaps are UP.

Set the flap lever to agree with the flap position.

Parking brake Set

Verify that the PARKING BRAKE SET message is shown.

Note: Do not assume that the parking brake will prevent airplane movement.

Accumulator pressure can be insufficient.

STABILIZER cutout switches Guards closed

FUEL CONTROL switches CUTOFF

FUEL CONTROL switch fire warning lights Verify extinguished

ALTERNATE FLAPS panel Set

ALTERNATE FLAPS ARM switch OFF

ALTERNATE FLAPS selector OFF

Captain audio control panel As needed

WARNING: Do not put objects between the seat and the aisle stand. Injury can occur when the seat is adjusted.

Seat Adjust

Adjust the seat for optimum eye reference.

Rudder pedals Adjust

Adjust the rudder pedals to allow full rudder pedal and brake pedal movement. Stow the rudder pedal adjust crank.

Seat belt and shoulder harness Adjust

Flight deck windows Closed and locked

Verify that the WINDOW NOT CLOSED decal does not show.

Route Verification Accomplish

Departure Briefing Accomplish

Note : LNAV and VNAV are not armed and the MCP V2 speed is not set until the final performance data has been loaded in the CDU and crosschecked.

The Captain calls for the Preflight Checklist.

Aircraft Acceptance C

The maintenance personnel will complete the Technical Log-Book.

Check Fuel Quantity matches with OFP/Requested Fuel figure

Check Fuel/Oil/Hydraulic quantities sufficient for flight

On receipt of Load and Trim sheet,

Log the time of receipt of trim sheet

Log the time of receipt of “All On Board” report from ground staff and Cargo Doors Closed (OM A 8.1.8.3.2.)

Captain	First Officer
ZERO FUEL WEIGHT(L&T)- Read out aloud	ZERO FUEL WEIGHT Enter into FMC CDU
TAKE OFF WEIGHT(L&T)- Read out aloud	Crosscheck with GROSS WEIGHT on FMC CDU
TAKE OFF WEIGHT Enter into EFB OPT TOW box and Select CALC *	TAKE OFF WEIGHT Enter into EFB OPT TOW box and Select CALC*
CG(L&T) - Read out aloud	CG –Enter into CDU CRUISE CG- Enter into CDU (obtained by subtracting 10 from CG)
Individually check EFB Calculation **	Individually check EFB Calculation**
SEL TEMP, FLAPS AND V SPEEDS(EFB OPT)- Read out aloud from OPT	SEL TEMP, FLAPS AND V SPEEDS (EFB OPT)- Crosscheck on OPT** Enter into CDU

* If due to equipment unavailability, only one takeoff calculation is possible, then the parameters used for calculation must be checked by the other crew member.

** Call out discrepancies, if any.

First officer shall record all applicable data into OFP Take Off Page.

Take Off Data : Briefing format

Captain	First Officer
	Select THRUST LIM page Read out from CDU
VERIFY T/O N1, SEL TEMP .against OPT data	TO MAX OR DERATE 10 SELECT TEMPERATURE_____
Verify PACK config. If 'APU to PACK' , then verify APU mode armed	PACKS ON/OFF OR APU TO PACK
Verify N1 against OPT data	N1 _____ CLB 1 OR CLB2 ARMED Select TAKEOFF Page
Verify FLAP Setting against OPT Data Verify V1,VR,V2 against OPT Data Verify ACCL HT against OPT Data	FLAPS_____ V1___VR___V2_____ STAB____UNITS Select next page ACCELERATION HT____FT
Announce “ TAKEOFF DATA CONFIRMED”	

CDU Display Set C,F/O

PF- TAKE OFF REF page or VNAV CLIMB page

PM-LEGS page

MCP Set C

IAS/MACH Selector Set V2

VNAV ARM

LNAV(if applicable) ARM

Initial HDG or TRACK Verify

Initial Altitude Verify

Before Start Procedure :

Start the Before Start Procedure after papers are on board and Preflight Checklist is completed. The FMC Performance Data entries must be complete before the 'Before Start Checklist'.

Obtain & Record departure clearance on OFP F/O

CAPTAIN will confirm the clearance with F/O and cross check the following:

- RTE pages show ATC cleared runway SID/ Transition routing
- Expected or cleared first altitude or flight level restriction displayed on the PFD.
- SSR code entered in the transponder.

Make a welcome aboard Passenger Address (PA) C

-Workload permitting, advisable at ETD minus 10 minutes

The In-flight Supervisor will check with the Captain, no ground personnel in the cockpit, will put the cockpit entry door guard down and close the cockpit door. The last open entry door is closed by the cabin crew when all passengers are seated.

Flight deck door Closed and locked F/O

Verify that the LOCK FAIL light is extinguished.

When all doors are closed as verified on DOOR synoptic,

Announce on PA ; "Cabin Crew Arm Doors" F/O

Check for EICAS memo message DOORS AUTO C, F/O

Obtain a clearance from Ground personnel to pressurize

the hydraulic systems C

If pushback is needed:

Nose gear steering Verify locked out C

The Captain calls for the "BEFORE START PROCEDURE"

HYDRAULIC panel Set F/O

WARNING : If the tow bar is connected, do not pressurize the hydraulic systems until the nose gear steering is locked out. Unwanted tow bar movement can occur.

Note: Pressurize the right system first to prevent fluid transfer between systems.

Right ELECTRIC DEMAND pump selector AUTO

Verify that FAULT light is extinguished.

Center 1 and Center 2 ELECTRIC PRIMARY pump switches ON

Verify that the Center 1 FAULT light is extinguished.

The Center 2 FAULT light may stay illuminated until after engine start because of load shedding.

Left ELECTRIC DEMAND pump selector AUTO

Verify that the FAULT light is extinguished.

Center 1 and Center 2 AIR DEMAND pump selectors AUTO

Verify that the FAULT lights are extinguished.

Fuel panel Set F/O

LEFT and RIGHT FUEL PUMP switches ON

Verify that the PRESS lights are extinguished.

If there is more than 4,800 kilograms of fuel in the center tank:

CENTER FUEL PUMP switches ON

One or both PRESS lights may stay illuminated until after the engine start because of load shedding.

CANCEL/RECALL switch Push F/O

Verify that only the expected alert messages are shown.

CANCEL/RECALL switch Push F/O

Verify that the messages cancel.

Set trim for takeoff C

Stabilizer trim ____ units.

Verify that the trim is in the green band.

Aileron trim - 0 units C

Rudder trim 0 units C

Transponder XPNDR F/O

ATC pushback/start up clearance Obtain F/O

BEACON light switch ON F/O

Call "BEFORE START CHECKLIST." C

Do the **BEFORE START** checklist F/O

Pushback or Towing Procedure

The Engine Start procedure may be done during pushback or towing.

Ground handling personnel Establish communications C

CAUTION: Do not hold or turn the nose wheel tiller during pushback or towing. This can damage the nose gear or the tow bar.

CAUTION: Do not use airplane brakes to stop the airplane during pushback or towing. This can damage the nose gear or the tow bar.

Parking brake Set or release C

Set or release as directed by ground handling personnel.

Call “PARKING BRAKE SET” after message displayed on EICAS. C

When pushback or towing is complete:

Tow bar Verify not connected C

Nose gear steering Verify not locked out C

Note : For cockpit ground communication phraseology refer to OMA 8.2.2.25.3. However, Engine Left and Engine Right phrases will be used on B777.

Engine Start Procedure

Select the secondary engine display F/O

Start sequence Announce C

Call “START Left/Right ENGINE” C

The term right and left is used with ground handling personnel and on the flight deck.

Engine START/IGNITION selector START F/O

FUEL CONTROL switch RUN C

On first indication of oil pressure rising,

Call “Oil pressure rising” F/O

Verify and call “checked” C

After the engine is stable at idle, start the other engine.

Autostart corrects for:

- no EGT rise
- a hot start
- a hung start

- no N1 rotation
- a compressor stall
- a starter shaft failure
- insufficient starter air pressure
- a start time that exceeds the maximum starter duty cycle time.

Do the ABORTED ENGINE START checklist for the following abort start condition:

- there is no oil pressure indication after the EGT increases.

After normal engine start:

Advise ground handling personnel to remove all ground equipmentC

Verify that the ground equipment is clear C, F/O

Before Taxi Procedure

Start this procedure when both engines are stabilized at idle and maximum start limit line (Red) is removed from EGT indication The Captain calls for the **“BEFORE TAXI PROCEDURE”**

APU selector As Needed F/O

ENGINE ANTI-ICE selectors As needed F/O

Verify that the ground personnel and equipment are clear and pin from ground crew sighted. C, F/O

Call “FLAPS ” as needed for takeoff. C

Flap lever Set takeoff flaps F/O

Flight controls Check C

Note : To avoid nuisance FLIGHT CONTROLS faults, a complete cycle of the control wheel during the flight control check should be done slowly (more than approximately 6 seconds) and not combined with the check of the pitch controls. Move the control wheel and the control column to full travel in both directions and verify:

- freedom of movement
- that the controls return to center

Hold the nose wheel tiller during the rudder check to prevent nose wheel movement.

Move the rudder pedals to full travel in both directions and verify:

- freedom of movement
- that the rudder pedals return to center

Recall Check C, F/O

Verify that only expected alert messages are shown.

EFB AIRPORT MAP application Select C, F/O

Select map as desired.

CAUTION: Do not use the Airport Map application as a primary navigation reference. The Airport Map application is designed to aid flight crew positional awareness only.

Update changes to the taxi briefing, as needed. C or PF

Call “BEFORE TAXI CHECKLIST.” C

Do the BEFORE TAXI checklist. F/O

Before Takeoff Procedure

Engine warm up requirements:

- engine oil temperature must be above the bottom of the temperature scale Engine warm up recommendations:
- run the engines for at least 3 minutes
- use a thrust setting normally used for taxi operations
- in case of extended ground operations, where a delay of 30 minutes or more is expected for taxi, consider shutdown of engine(s), making sure APU is started before engine shutdown. Before shutdown, make sure the engines have run for 3 minutes or more

Captain	First Officer
	Obtain a clearance to taxi.
The PF updates changes to the taxi route and departure briefing as needed.	
	When cleared for taxi, set the TAXI and RUNWAY TURNOFF light switches to ON. Select CAM ON
Verify and call “LEFT CLEAR”.	Verify and call “RIGHT CLEAR”.
Release the parking brake.	
Calls “CHECKED”.	Verify “CABIN READY” message and call “CABIN READY”.
Call “BEFORE TAKEOFF CHECKLIST”.	Do the BEFORE TAKEOFF checklist.

Takeoff Considerations

LNAV Departure :

If LNAV is to be used for departure, accomplish the following procedures ;

Verify the aircraft symbol is in close proximity to the departure end of the runway symbol on the ND in the 10 NM scale. :

- If GPS NAV is on, the TO/GA update function is inhibited.
- If GPS NAV is off, the FMC updates position to the takeoff runway threshold when a TO/GA switch is pushed.
- When an intersection takeoff is made with GPS NAV off, the intersection displacement distance from the runway threshold must be entered on the TAKEOFF REF page. :

Line-up Procedure

Before entering the departure runway, verify that the runway and runway entry point are correct.

The pilot in view of the approach sector verifies and calls “APPROACH CLEAR”.

The other pilot verifies and calls “CHECKED”.

Observe runway markings. Verify correct orientation.

Captain	First Officer
CALL “LINE-UP PROCEDURE”	When entering the departure runway, set the STROBE light switch to ON. Select CAM OFF. Set the transponder mode selector to TA/RA.
Verify TFC displayed on ND. Set Weather radar display ON.	Verify TFC displayed on ND. Set TERRAIN display ON

Take-off Procedure :

Captain	First Officer
Announce “TAKE-OFF” Verify that the brakes are released. Align the airplane with the runway.	When cleared for takeoff, set ALL LANDING light switches to ON.
Advance the thrust levers to approximately 55% N1. Allow engines to stabilize.	
Push the TO/GA switch. When THR REF appears in FMA, Call “THRUST REF” Call “SET TAKEOFF THRUST”.	
	Verify that the correct Takeoff thrust is set and call “THRUST SET” and start elapsed time on the clock.
Call “YOUR CONTROLS” if the First Officer is the pilot flying, after the call “THRUST SET”.	Call “MY CONTROLS” if pilot flying.

Pilot Flying	Pilot Monitoring
	Monitor the engine instruments during the takeoff. Call out any abnormal indications. Adjust takeoff thrust before 80 knots as needed. During strong headwinds, if the thrust levers do not advance to the planned takeoff thrust by 80 knots, manually advance the thrust levers.
After takeoff thrust is set, the Captain’s hand must be on the thrust levers until V1.	
Monitor airspeed. Maintain light forward pressure on the control column.	Monitor airspeed and call out any abnormal indications.

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Verify 80 knots and call "CHECKED."	Call "80 KNOTS."
Verify V1 speed.	Verify the automatic V1 callout or call "V1."
At VR, rotate toward 15° pitch attitude. After liftoff, follow F/D commands. Establish a positive rate of climb.	At VR call "ROTATE." Monitor airspeed and vertical speed.
	Verify a positive rate of climb on the altimeter and call "POSITIVE RATE."
Verify a positive rate of climb on the altimeter and call "GEAR UP."	
	Set the landing gear lever to UP
Above 400 ft. radio altitude, call for a roll mode as needed or verify LNAV engaged.	Select or verify the roll mode. Verify VNAV engaged.
Verify that climb thrust is set at the thrust reduction height.	

Pilot Flying	Pilot Monitoring
Verify acceleration at the acceleration height. Call "FLAPS " according to the flap retraction schedule.	
	Set the flap lever as directed.
Call "ENGAGE AUTOPILOT" when above the minimum altitude for autopilot engagement.	Engage the autopilot.
	After flap retraction is complete, set the ENGINE ANTI-ICE selectors to AUTO.
Call "AFTER TAKEOFF CHECKLIST."	Do the AFTER TAKEOFF checklist.

Note: For Assisted Takeoff, when the First Officer is the Pilot Flying, the Captain will handle the thrust levers for the takeoff including setting of takeoff thrust, the decision and actions to Reject Takeoff is the responsibility of the Pilot occupying the left seat.

After Takeoff and Climb :

If an immediate turn is required due to obstacle clearance, noise abatement, or departure procedures, initiate the turn at the appropriate altitude.

After completing the turn and at or above flap retraction altitude, accelerate and retract flaps while climbing.

Takeoff Flap Retraction Speed Schedule

Takeoff Flaps	At “Display”	Select Flaps
20 or 15	“20” or “15”	5
	“5”	1
	“1”	UP
5	“5”	1
	“1”	UP

Climb and Cruise Procedure

Complete the After Takeoff Checklist before starting the Climb and Cruise Procedure.

Note: Maintain at least 15 knots above minimum maneuver speed when climbing through FL200 to prevent the EICAS caution message, “AIRSPEED LOW” from occurring.

Pilot Flying	Pilot Monitoring
<p>At transition altitude, set and crosscheck the altimeters to standard.</p> <p>The standby altimeter is set to standard by the Captain.</p>	
Set altimeter to standard and call “STANDARD”, Flight Level “ ”.	<p>Call “TRANSITION” at transition altitude.</p> <p>Set altimeter to standard, and verify altimeter setting and indication and call “CHECKED”.</p>
	<p>At or above 10,000 ft. MSL, set LANDING/RWY TURN OFF/Taxi lights OFF.</p> <p>Set the Passenger signs to Auto.**</p> <p>Set LOGO Light Switch to OFF (if applicable)</p> <p>Send departure report on ACARS.</p>
	<p>If the FUEL IN CENTER message shows, set both CENTER FUEL PUMP switches to ON.</p> <p>When the FUEL LOW CENTER message shows, set both CENTER FUEL PUMP switches to OFF.</p>
<p>Before the Top of Descent, modify the active route as needed for the arrival and approach.</p> <p>Verify or enter the correct RNP for the arrival.</p> <p>Put in the Diversion alternate Company route on RTE 2 or any alternate approach expected at the destination (At Captain.s discretion).</p>	



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**** For flights departing from Delhi, the seat belt sign shall be ON from engine start until crossing 50 nm or FL 150 whichever is later.**

Note : In case of any discrepancy between 'Calculated' and 'Totalizer' fuel quantities, the lower of these indications should be used for decision making.

Descent Procedure

Start the Descent Procedure 10 minutes before the airplane descends below the cruise altitude for arrival at destination.

Complete the Descent Procedure by Top of Descent.

Pilot Flying	Pilot Monitoring
Review all alert messages. Review all operational notes.	Recall and review all alert messages. Recall and review all operational notes. Obtain destination ATIS.
Modify the FMC as needed for the arrival and approach : <ul style="list-style-type: none"> DEP/ARR INDEX page: Enter route as required for arrival and approach RTE LEGS page: Verify or enter required speed and altitude at waypoints, final approach fix/point, outer marker, the runway and the last point of the missed approach procedure DESCENT page: Enter descent speed the same as the last CRZ Mach Number/SPEED Set the Radio/Baro minimums as needed for the approach. Preselect QNH setting. 	Verify the FMC entries for the arrival and approach. Set AUTOBRAKE selector to the requested (by PF) brake setting. Set the Radio/Baro minimums as needed for the approach. Preselect QNH setting.
Enter VREF on the APPROACH REF page	Verify VREF on the APPROACH REF page
Confirm on NAV RADIO page the course and frequency for the approach is correct	Verify on NAV RADIO page the course and frequency for the approach is correct

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Pilot Flying	Pilot Monitoring
Set the Rwy/Wind/Temperature / QNH/ Landing Weight on the Performance page in the EFB. Verify runway length is adequate. Verify VREF for Landing.	Set the Rwy/Wind/Temperature/ QNH/ Landing Weight on the Performance page in the EFB. Verify runway length is adequate. Verify VREF for Landing.
Approach Briefing.	
Brief IFS on Arrival Time (Delay if Any) / Temperature and any significant information.	
At Top of Descent ask for Seat Belt selector to be Switched ON.	Select Seat Belt selector ON.
Call "DESCENT CHECKLIST".	Do the DESCENT checklist.

Approach Procedure

The Approach Procedure is normally started at transition level.

Complete the Approach Procedure before:

- the initial approach fix, or
- the start of radar vectors to the final approach course, or
- The start of a visual approach

Pilot Flying	Pilot Monitoring
	At or above 10,000 ft. MSL, set the ALL LANDING, TAXI, and RUNWAY TURNOFF light switches to ON. LOGO Light Switch ON (If Applicable) Cycle NO SMOKING selector twice .
Verify the CABIN READY message and call "CHECKED".	Verify that the cabin is secure for landing by observing the CABIN READY message and call "CABIN READY"
At transition level, set and crosscheck the altimeters.	

The Standby Altimeter is set by the Captain.	
Where transition level is assigned by ATC, and clearance to descend on QNH is received, Set altimeter and call QNH ___ and passing “___”ft. (e.g. LHR)*	Set altimeter to QNH setting. Verify altimeter setting, crosscheck indication and call “CHECKED”.
Where transition level is published, Set altimeter and call QNH ____ and passing “___” ft. (e.g.HKG)	Call “TRANSITION” at the transition level. Set altimeter to QNH setting. Verify altimeter setting, crosscheck indication and call “CHECKED”.
Verify Navigation aids are identified.	
Update changes to the arrival and approach procedures as needed. Update changes to the RNP as needed.	
Update the approach briefing as needed.	
Call “APPROACH CHECKLIST.”	Do the APPROACH checklist.

* For airports in India, QNH is set passing Transition Level as per local altimeter setting procedure even though “TRANSITION LEVEL BY ATC” is depicted on jeppesen approach charts

Flap Extension Schedule

Current Flap Position	At Speed Tape Display	Select Flaps	Command Speed for Selected Flaps
UP	UP	1	1
1	1	5	5
5	5	20	20
20	20	25 or 30	(VREF25 or VREF30) + wind additives

Delayed Flap Approach

If the approach is not being conducted in adverse weather conditions that would make it difficult to achieve stabilized approach criteria, the final flap selection may be delayed to conserve fuel and reduce noise and emissions or to accommodate speed requests by ATC.

Delayed flap approach can be conducted on precision, non-precision and visual approaches.

At 2000 ft.AFE ;

- Extend landing gear,
- Select Flaps 20,
- Set Flaps 20 speed.

Approaching 1,500 AFE;

- Select landing flaps,
- Set Vapp
- Do the landing checklist.

The approach must be stabilized at applicable gates as per the Stabilized Approach Policy

Landing Procedure - ILS

Pilot Flying	Pilot Monitoring
Call "FLAPS____" according to the flap extension schedule.	Set the flap lever as directed.
When on localizer intercept heading: <ul style="list-style-type: none"> • verify that the ILS is tuned and identified • verify that the LOC and G/S pointers are shown 	
Arm the APP mode after approach Clearance received.	
Use LNAV, HDG SEL/TRK SEL or HDG HOLD/TRK HOLD to intercept the final approach course as needed.	

Verify localizer alive and call "CHECKED".	At the first positive inward movement of localizer pointer, call "LOCALIZER ALIVE."
Verify that the localizer is captured.	
At glide slope alive, call: <ul style="list-style-type: none"> • "GEAR DOWN" • "FLAPS 20" 	At the first positive motion of glide slope capture, call "GLIDE SLOPE ALIVE" Set the landing gear lever to DN. Set the flap lever to 20.
Set the speedbrake lever to ARMED.	
At glide slope capture, call "FLAPS_ " as needed for landing.	Set the flap lever as directed.
Set the missed approach altitude on the MCP.	Verify missed approach altitude is set and call "CHECKED".
Call "LANDING CHECKLIST."	Do the LANDING checklist.
At the final approach fix or OM, verify the crossing altitude and QNH.	
Monitor the approach. Verify the Autoland status at 500 ft Radio Altitude	

Pilot Flying	Pilot Monitoring
At 1500 ft RA verify and check.	At 1500 RA call "ROLLOUT, FLARE ARMED, LAND2 OR LAND 3" OR
	"NO AUTOLAND" OR FLIGHT DIRECTOR"

Landing Procedure - Instrument Approach Using VNAV

Use the autopilot during the approach to give:

- autopilot alerts and mode fail indications
- more accurate course and glide path tracking
- lower RNP limits

This procedure is not authorized using QFE.

Instrument Approach Using VNAV

When specifically authorized by the instrument procedure and regulatory authority, approaches may be flown to the following minima:

- a published VNAV DA(H)
- a published MDA(H) used as a decision altitude

When either of the above minima are not specifically approved, use the published MDA(H)+50 feet as the MAP.

This is referred to as DDA - Derived Decision Altitude.

Pilot Flying	Pilot Monitoring
Call “FLAPS___”according to the flap extension schedule.	Set the flap lever as directed.
The recommended roll modes for the final approach are: <ul style="list-style-type: none"> • for a RNAV or GPS approach use LNAV • for a LOC-BC, VOR, or NDB approach use LNAV • for a LOC, SDF, or LDA approach use LNAV or LOC 	
	Verify that the VNAV glide path angle is shown on the final approach segment of the LEGS page.
When on the final approach course intercept heading for LOC, LOC-BC, SDF, or LDA approaches: <ul style="list-style-type: none"> • verify that the localizer is tuned and identified • verify that the LOC pointer is shown 	
Arm the LNAV or LOC mode after approach clearance is given.	
WARNING: When using LNAV to intercept the localizer, LNAV might parallel the localizer without capturing it. The airplane can then descend on the VNAV path with the localizer not captured.	
Use LNAV, HDG SEL, TRK SEL, HDG HOLD, or TRK HOLD to intercept the final approach course as needed.	
Verify localizer alive and call “CHECKED”.	At first positive inward motion of localizer pointer, call “LOCALIZER ALIVE”.

Pilot Flying	Pilot Monitoring
Verify that LNAV is engaged or that the localizer is captured.	
<p>At 2 NM before the final approach fix and after ALT, VNAV PTH, or VNAV ALT is annunciated, verify approaching glide path and call "CHECKED:</p> <ul style="list-style-type: none"> • verify that the autopilot is engaged • set MDA(H) or DDA(H) on the MCP • select or verify VNAV • select or verify speed intervention • Call: "GEAR DOWN FLAPS 20" 	<p>Call "APPROACHING GLIDE PATH."</p> <p>Set the landing gear lever to DN</p> <p>Set the flap lever to 20</p>
Set the SPEEDBRAKE lever to ARMED.	
Beginning the final approach descent, call "FLAPS____" as needed for landing.	Set the flap lever as directed
Call "LANDING CHECKLIST."	Do the LANDING checklist.
When at least 300 ft. below the missed approach altitude, set the missed approach altitude on the MCP.	Verify the missed approach altitude set and call "CHECKED".
At the final approach fix, verify the crossing altitude and QNH and call "CHECKED".	At the final approach fix, call "FINAL APPROACH FIX, ____ ft., ____ QNH".
Monitor the approach.	
If suitable visual reference is established at MDA(H), DDA(H), or the missed approach point, disengage the autopilot.	<p>Set F/D switches to OFF.</p> <p>Set PM F/D switch to ON after intercepting the visual profile.</p>
Maintain the glide path to landing.	

Go-Around and Missed Approach Procedure

Pilot Flying	Pilot Monitoring
At the same time: <ul style="list-style-type: none"> push the TO/GA switch call “FLAPS 20” 	Position Flap lever to 20.
Verify: <ul style="list-style-type: none"> the rotation to go-around attitude that the thrust increases 	
	Verify that the thrust is sufficient for the go-around or adjust as needed.
	Verify a positive rate of climb on the altimeter and call “POSITIVE RATE.”
Verify a positive rate of climb on the altimeter and call “GEAR UP.”	
Set the landing gear lever to UP.	
Limit bank angle to 15 degrees if airspeed is below minimum maneuver speed.	Inform ATC of ‘Go Around and the reason.
Above 400 ft. radio altitude, select or verify a roll mode or verify LNAV engaged.	Verify that the missed approach altitude is set.
Verify that the missed approach route is tracked.	
At acceleration height of 1500 ft AGL, set speed to the maneuver speed for the planned flap setting. Call “FLAPS ” according to the flap retraction schedule.	Set the flap lever as directed.
After flap retraction to the planned flap setting, select FLCH or VNAV as needed.	
Verify that climb thrust is set.	
Verify that the missed approach altitude is captured.	
Pilot Flying	Pilot Monitoring
Call “AFTER TAKEOFF CHECKLIST.”	Do the AFTER TAKEOFF checklist.

Landing Roll Procedure

Pilot Flying	Pilot Monitoring
<p>Verify that the thrust levers are closed.</p> <p>Verify that the SPEEDBRAKE lever is UP.</p> <p>Deploy SPEEDBRAKES.</p>	<p>Verify that the SPEEDBRAKE lever is UP.</p> <p>Call “SPEEDBRAKES UP”.</p> <p>If the SPEEDBRAKE lever is not UP, call “SPEEDBRAKES NOT UP”.</p>
Monitor the rollout progress.	
Verify correct autobrake operation.	
WARNING: After the reverse thrust levers are raised, a full stop landing must be made. If an engine remains in reverse, safe flight is not possible.	
<p>Without delay, raise the reverse thrust levers to the interlocks and hold light pressure until the interlocks release.</p> <p>Then apply reverse thrust as needed.</p>	<p>Verify that the forward thrust reversers are closed.</p> <p>When both REV indications are green, call “REVERSERS NORMAL”.</p> <p>If there is no REV indication(s) or the indication(s) remain amber, call “ NO REVERSER LEFT ENGINE” or “NO REVERSER RIGHT ENGINE” or “NO REVERSERS”</p>
Apply reverse thrust as needed	
<p>Verify 60 knots and call “CHECKED”. Start movement of the reverse thrust levers such that they reach the reverse idle detent before taxi speed.</p>	<p>Call “60 KNOTS.”</p>
<p>After the engines are at reverse idle, move the reverse thrust levers full down.</p>	
<p>Before taxi speed, disarm the auto brake and call “MANUAL</p>	<p>Verify autobrake has disarmed and call “AUTOBRAKE”.</p>

BRAKING”. Use manual braking as needed.	
Before turning off the runway, disconnect the autopilot.	
Captain	First Officer
Call “MY CONTROLS” at taxi speed if First Officer is Pilot Flying.	Reply “YOUR CONTROLS” if Pilot Flying.
CAUTION: Do not use the Airport Map application as a primary navigation reference. The Airport Map application is designed to aid flight crew positional awareness only.	

Taxi In Procedure

Start the After Landing procedure when clear of the active runway.

Captain calls “TAXI IN PROCEDURE”

Captain	First Officer
Position the SPEEDBRAKE lever down when clear of the active runway.	
	Select CAM ON.
	Set the APU selector to START, then ON.*
	Set the ENGINE ANTI-ICE selectors to ON, if needed.
	Set the STROBE light switch to OFF.
	Set the LANDING light switches to OFF
Set the weather radar display to off.	Set the Terrain display to off.
	Set the AUTOBRAKE selector to OFF.
	Set the flap lever to UP.
	Set the TRANSPONDER MODE selector to XPNDR.

	When approaching gate or parking position, select SECONDARY ENGINE DISPLAY.
When approaching gate or parking position, call “LIGHTS OFF”.	Set TAXI and RUNWAY TURNOFF light switches to OFF.

* The APU start may be delayed until the aircraft is 2 minutes away from parking bay or 2 bays away

Single Engine Taxi In

After landing if extended ground operation (more than 15 minutes) is expected, the Captain in his judgement keeping in mind the existing environmental conditions and topography, may elect to shutdown one engine for taxi.

The following guidelines are to be kept in mind:

- After landing, the APU must be started.
- One engine may be shutdown after 3 minutes from the time engine reverse is returned to idle.
- Be aware in operational environments such as an uphill slope, high gross weight, congested ramp area or wet/slippery ramps and taxiways, it is recommended to taxi with both engines.
- The crew must be aware of hydraulic, electrical, and braking system requirements.
- The APU must be available.

Shutdown Procedure

Start the Shutdown Procedure after taxi is complete.

Parking brake Set C

Verify that the PARKING BRAKE SET message is shown.

Electrical power Set F/O

If APU power is needed:

Check that the APU RUNNING message is shown.

If external power is needed:

Verify that the PRIMARY EXTERNAL POWER AVAIL light is illuminated.

PRIMARY EXTERNAL POWER switch Push F/O

Verify that the ON light is illuminated.

If the SECONDARY EXTERNAL POWER AVAIL light is illuminated:

SECONDARY EXTERNAL POWER switch Push F/O

Verify that the ON light is illuminated.

FUEL CONTROL switches CUTOFF C

If towing is needed

Ground handling personnel Establish communications C

WARNING: If the nose gear steering is not locked out, any change to hydraulic power with the tow bar connected may cause unwanted tow bar movement.

Nose gear steering Verify locked out C

CAUTION: Do not hold or turn the nose wheel tiller during pushback or towing. This can damage the nose gear or the tow bar.

CAUTION: Do not use airplane brakes to stop the airplane during pushback or towing. This can damage the nose gear or the tow bar.

Parking brake Set or release C

Set or release as directed by ground handling personnel.

If towing is not needed or when towing complete:

DOOR synoptic switch Push F/O

Announce on Passenger Address: "Cabin Crew Disarm Doors" F/O

Verify all Doors in Manual Mode C, F/O

Captain Calls for "Shutdown Procedure"

SEAT BELTS selector OFF F/O

HYDRAULIC panel Set F/O

Note: Depressurize the right system last to prevent fluid transfer between systems.

Center 1 and Center 2 AIR DEMAND pump selectors ... OFF F/O

Left ELECTRIC DEMAND pump selector OFF F/O

Center 1 and Center 2 ELECTRIC PRIMARY

pump switches OFF F/O

Right ELECTRIC DEMAND pump selector OFF F/O

FUEL PUMP switches OFF F/O

BEACON light switch OFF F/O

FLIGHT DIRECTOR switches OFF C, F/O
 Transponder Panel Set F/O
 Transponder mode selector - STBY
 Transponder code window - 2000
 IAS/MACH selector Set 100 C
 EFB CLOSE FLIGHT Select C, F/O
 EFB POWER switch Push C, F/O
 Status messages Check C, F/O

Note: Disregard EICAS alert and status messages displayed during the PFC self test after hydraulic shutdown. Wait approximately 3 minutes after HYD PRESS SYS L+C+R message is shown before recording status and alert messages in the maintenance log.

After wheel chocks are in place:

Parking brake Release C
 APU selector As needed F/O

To conserve fuel and reduce emissions, it is recommended to select external power if available and switch off the APU as soon as practicable.

FLIGHT DECK ACCESS SYSTEM switch Off C or F/O
 Call “SHUTDOWN CHECKLIST.” C
 Do the SHUTDOWN checklist. F/O

After Shutdown Procedure

Captain	First Officer
Reset Chronograph/Elapsed time.	
Deselect BARO/RADIO minimums.	
Select VOR/ADF switches to OFF.	
Select map light switches to OFF.	
Set lighting controls to center detent.	
Select FMC CDU PROG page 2. Fill out Technical Log.	Send Arrival report. Record fuel burn, fuel remaining and OFF, OUT, IN, ON times on OFP
Select FMC CDU IDENT page.	
Stow the Enroute charts used back in their folder.	
Stow headsets in their stowage space.	
Stow all the flight documents in the folder provided.	

Secure Procedure

This procedure is accomplished before leaving aircraft unattended either by maintenance or flight crew (if maintenance personnel not available).

The flight crew before carrying out this procedure should ensure that all passengers have de-planed.

ADIRU switch	OFF	F/O
EMERGENCY LIGHTS switch	OFF	F/O
PACK switches	OFF	F/O
Call "SECURE CHECKLIST."		C
Do the SECURE checklist		F/O



B777 Standard Operating Procedures

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Normal Procedures

Standard Callouts

Standard Callouts

Both crewmembers should be aware of altitude, airplane position and situation.

Avoid non-essential conversation during critical phases of flight, particularly during taxi, takeoff, approach, and landing. Unnecessary conversation reduces crew efficiency and alertness and is not recommended when below 10,000 feet MSL/FL 100. At high altitude airports, adjust this altitude upward as required.

The PM makes callouts based on instrument indications or observations for the appropriate condition. The PF should verify the condition/location from the flight instruments and acknowledge.

If the PM does not make the required callout, the PF should make it.

The PM calls out significant deviations from command airspeed (+/- 10 kts and +10/-0 kts during approach phase) or flight path. Either pilot should call out any abnormal indications of the flight instruments (flags, loss of deviation pointers, etc.).

One of the basic fundamentals of CRM is that each crew member must be able to supplement or act as a backup for the other crew member. Proper adherence to standard callouts is an essential element of a well-managed flight deck. These callouts provide both crew members required information about airplane systems and about the participation of the other crew member. The absence of a standard callout at the appropriate time may indicate a malfunction of the airplane system or indication, or indicate the possibility of incapacitation of the other pilot.

The PF should acknowledge all GPWS voice callouts during approach except altitude callouts at 100 feet, 50 feet, 30 feet, 20 feet and 10 feet. If the automatic electronic voice callout is not heard by the crew member, the PM should make the callout.

Note:

- If the automatic callouts are not available, the PM should call out “100 feet”, “50 feet”, “30 feet”, “20 feet” and “10 feet” to aid in developing an awareness of eye height at touchdown.
- Should the automated callouts fail, the “1000”, “500”, “Approaching Minimums”, and “Minimums” callouts must be : verbalized by the PM.
- All calls will be acknowledged whenever one pilot has made a monitoring call; the other pilot will respond with “CHECKED” to confirm that he has heard the call and concurs with the call. Proper

adherence is required to provide early detection of crew member incapacitation during critical phases of flight.

- When a navigation aid gets tuned and identified, it should be announced.
 - Transfer of control should be called/acknowledged; “YOUR CONTROLS”/ “MY CONTROLS”.
 - Similarly, transfer of radio monitoring responsibility should be called/acknowledged by “YOUR RADIO”/ “MY RADIO”.
 - At any time a pilot requests an ATC clearance, the other pilot should also monitor the frequency.
 - For standard call to be effective, they should be given at the correct time. Failure to make a call at the appropriate time does not mean it should be omitted. At busy times it may be convenient to anticipate a call or delay it to an appropriate quiet period.
 - On any approach, when the Pilot Flying can maintain visual contact with the runway, the “APPROACHING MINIMUMS” and “MINIMUMS” callouts are auto callouts.
 - If the Radio Altimeter is inoperative, the “1000” and “500” AGL standard callouts must be determined by reference to the barometric altimeter.
-

Critical Flight Actions

All pilots are to crosscheck flight crew critical actions such as:

- configuration changes
- heading, altitude, altimeter, and speed settings
- transfer of controls
- changes to AFDS/FMS and manual change of nav aids on the NavRad page
- performance calculation on the OPT and CDU entries on the FMC

Standard Callouts :

Condition / Location		Callout (Captain)	Callout (First Officer)
Ramp			“CABIN CREW ARM DOORS”
Engine Start			“OIL PRESSURE RISING”
Prior to Taxi		“LEFT CLEAR”	“RIGHT CLEAR”
Taxi	Upon receiving CABIN READY Message	“CHECKED”	“CABIN READY”
	Prior to entering departure runway, the pilot in view of the approach sector	“APPROACH CLEAR”	“APPROACH CLEAR”
Takeoff		“THRUST REF” “SET TAKEOFF THRUST”	When thrust is set, “THRUST SET”
		If First Officer is Pilot Flying: “YOUR CONTROLS”	“MY CONTROLS”

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Condition / Location		Callout (PM)	Callout (PF)
Takeoff		“80 KNOTS” “V1”* “ROTATE” “POSITIVE RATE”	“CHECKED” “GEAR UP”
Climb	Transition Altitude	“TRANSITION” “ALTIMETERS RESET_”(in or mb)	“STANDARD, flight level_”
	1000 ft. below assigned altitude /flight level	“1000 TO GO”	“CHECKED”
*Not required if auto callouts are functional.			

Standard Callouts :

Condition / Location		Callout (PM)	Callout (PF)
Cruise	FUEL IN CENTER message displayed		“CENTER FUEL PUMP SWITCHES ON”
	FUEL LOW CENTER message displayed		“CENTER FUEL PUMP SWITCHES OFF”
Descent	1000 ft. above assigned altitude/ flight level	“1000 TO GO”	“CHECKED”
	10,000 ft./ Flight Level 100	“10,000/Flight Level 100”	“CHECKED”
	At Transition Level	“TRANSITION LEVEL, ALTIMETERS RESET _” (in or mb)	“ __QNH, __ft.”
	Upon receiving CABIN READY message	“CABIN READY”	“CHECKED”
	Before commencing approach	“NAVAIDS TUNED AND IDENTIFIED”	“CHECKED”

Standard Callouts- ILS Approach

Condition / Location	Callout (PM)	Callout (PF)
First positive inward motion of localizer pointer	“LOCALIZER ALIVE”	“CHECKED”
Localizer capture	“CHECKED”	“LOCALIZER CAPTURE”
First positive motion of glide slope capture	“GLIDE SLOPE ALIVE”	“CHECKED”
Glide Slope capture	“CHECKED”	“GLIDE SLOPE CAPTURE”
Outer Marker or equivalent	“OUTER MARKER, ____ft., ____QNH” e.g., “OUTER MARKER, 2790ft., 1013”	“CHECKED”
1,000 ft. AFE	“1000”* “STABILIZED”	“CHECKED”
500 ft. AFE	“500” *	“LAND 2”/ “LAND 3/ OR “NO AUTOLAND”
100 ft. above DA(H)	“APPROACHING MINIMUMS”	“CHECKED”
AT DA(H) WITH SUITABLE VISUAL REFERENCES ESTABLISHED, i.e., PM CALLS VISUAL CUES	“MINIMUMS” “APPROACH LIGHTS, TOUCHDOWN ZONE LIGHTS,”	“CONTINUE”

Standard Callouts;

ILS CAT II / III Approaches :

Condition	Auto Callouts	First Officer	Captain
2500 FT RA	“2500”		
Approximately 1500 RA		“ROLLOUT, FLARE ARMED, LAND3/LAND2”	“CHECKED”
1000 FT RA	“1000”	“STABILIZED”	“CHECKED”
500 FT RA		“500”	“LAND 2” OR “LAND 3”
200 FT RA (CAT IIIB)		“ALERT HEIGHT”	“CONTINUE” OR “GO AROUND”
Approaching DH (CAT II, CAT IIIA)	“APPROACHING MINIMUMS”*		
DH(CAT II, CAT IIIA)	“MINIMUMS”*	“MINIMUMS” IF NO AUTO CALLOUT	“CONTINUE” OR “GO AROUND”
At 50 ft, RA FLARE does not capture		“NO FLARE”	“GO AROUND”
At Approx 25 ft, IDLE does not capture		“NO IDLE”	
At Touch Down, ROLL-OUT does not capture		“NO ROLLOUT”	
If off centerline during rollout		“STEER RIGHT” OR “STEER LEFT” AS APPROPRIATE	



B777 Standard Operating Procedures

Condition / Location	Callout (PM)	Callout (PF)
At DA(H) If suitable visual references not established,	“MINIMUMS”	“GO-AROUND”

Standard Callouts - Non-ILS Approach

Condition / Location		Callout PM	Callout PF
First positive inward motion of localizer course deviation indicator		“LOCALIZER ALIVE”	“CHECKED”
Localizer capture		“CHECKED”	“LOCALIZER CAPTURE”
At 2 NM before the final approach fix		“APPROACHING GLIDE PATH”	“CHECKED”
Final approach fix inbound		“VOR/NDB/FAF, ____ft., ____QNH” e.g., “VOR/NDB/FAF, 3000 ft., 1013”	“CHECKED”
CANPA OR CDFA	DME versus ALT	“__DME, __ ft.”**	“CHECKED”
	TIME versus ALT	“__ SECONDS, __ft.”**	“CHECKED”
1,000 ft. AFE		“1000” * “STABILIZED”	“CHECKED”
500 ft. AFE		“500”	“CHECKED”
100 ft. above MDA		“APPROACHING MINIMUMS” *	“CHECKED”
* No Voice Callouts from PM required if Auto Callouts are functional. ** Instrument Approach Altitude			

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Condition / Location			Callout (PM)	Callout (PF)
CANPA OR CDFA	At MDA or DDA with suitable visual references established, i.e., PM calls visual cues		“MINIMUMS”* “APPROACH LIGHTS, TOUCH-DOWN ZONE LIGHTS”	“CONTINUE”
	At MDA or DDA with suitable visual references not established, i.e. PM does not call any visual cues		“MINIMUMS”*	“GO-AROUND”
Non-CANPA/ CDFA	At MDA	Suitable visual references established, i.e., PM calls visual cues	“MINIMUMS”* “APPROACH LIGHTS, TOUCHDOWN ZONE LIGHTS”	“CONTINUE”
		Suitable visual references not established, i.e., PM does not call visual cues	“MINIMUMS”*	“CONTINUE TO MISSED APPROACH POINT”
	At MAP	Suitable visual references established, i.e., PM calls visual cues	“MISSED APPROACH POINT” “APPROACH LIGHTS, TOUCHDOWN ZONE LIGHTS”	“CONTINUE”
		Suitable visual references not established, i.e., PM does not call visual cues	“MISSED APPROACH POINT”	“GO-AROUND”

Condition / Location	Callout (PM)	Callout (PF)
Unstabilised Approach-IMC At “1000”ft AFE	“APPROACH NOT STABILISED”	“GO AROUND”
Unstabilised Approach-VMC At “1000”ft AFE Subsequently. At “500” ft AFE	If approach is stabilized, call “STABILISED”	“CORRECTING” “CHECKED”
	If approach is not stabilised, call “APPROACH NOT STABILISED”	“GO AROUND”
Anytime an approach is not stabilized at 1000 FT AFE IN IMC/ 500 FT.AFE IN VMC Or an approach that becomes unstabilised below appropriate stabilization gates	First call “APPROACH NOT STABILISED” If there is insufficient, incorrect or no response from PF “GO AROUND CAPTAIN” If there is no response from PF “MY CONTROLS CAPTAIN” “GO AROUND”	“GO AROUND”
AT MINIMUMS	If no response from PF, the PM will take over controls and call “I HAVE CONTROLS” and will state intentions, i.e., “CONTINUE” or “GO AROUND” :	

Condition / Location	Callout (PM)	Callout (PF)
Landing Roll	“SPEEDBRAKES UP” or “SPEEDBRAKES NOT UP” “REVERSERS NORMAL” OR “NO REVERSER LEFT ENGINE” OR “NO REVERSER RIGHT ENGINE” OR “NO REVERSERS” “AUTOBRAKE” “60 KNOTS”	“CHECKED” or “CHECKED” (Deploy speedbrake manually) “CHECKED” Apply reverse thrust as needed “MANUAL BRAKING” “CHECKED”

Condition / Location	Callout (Captain)	Callout (First Officer)
At taxi speed, if First Officer is Pilot Flying	“MY CONTROLS”	“YOUR CONTROLS”
Ramp		“CABIN CREW DISARM DOORS”

Precautionary Calls

Event	PM Callout
Excessive or insufficient bank angle	“BANK ANGLE”
Excessive or insufficient pitch attitude	“PITCH”
Rate of descent more than 1000 fpm on final approach below 500 ft. AFE	“SINK RATE”
A decreasing rate of climb during takeoff or go-around phase	“CLIMB RATE”
Speed consistently more than 10kts above/below the selected target speed	“SPEED”
Speed below VREF on final approach	“SPEED”
Glide slope deviation more than one dot	“GLIDE SLOPE”
Localizer deviation more than one dot	“LOCALIZER”

Note: The Pilot Flying will acknowledge these callouts and initiate corrective action.

Standard Phraseology

Standardization of crew communications is essential to increase efficiency of crew coordination. Standard phraseology is used to convey information with a minimum number of words that have meaning to all crewmembers.

A partial list of recommended words and phrases follows.

Thrust

- “SET TAKEOFF THRUST”
- “SET GO-AROUND THRUST”
- “SET MAXIMUM CONTINUOUS THRUST”
- “SET CLIMB THRUST”
- “SET CRUISE THRUST”

Flap Settings:

- “FLAPS UP”
- “FLAPS ONE”
- “FLAPS FIVE”
- “FLAPS FIFTEEN”
- “FLAPS TWENTY”
- “FLAPS TWENTY-FIVE”
- “FLAPS THIRTY”

Airspeed:

- “80 KNOTS”
 - “V1”
 - “ROTATE”
 - “SET___ KNOTS”
 - “SET VREF PLUS (additive)”
 - “SET FLAPS___ SPEED”
-



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Normal Procedures

Stabilized Approach Policy

Stabilized Approach Policy

All flights must be stabilised by 1000 feet AFE gate in IMC and by 500 feet AFE gate in VMC. VMC is defined as follows :

Table 1 - 1 VMC Visibility and Distance from Cloud :

Altitude band Cloud	Airspace Class	Flight Visibility	Distance from
At and below 3000 ft (900 m) AMSL or 1000 ft (300m) above terrain,	A B C D E	5 km	1500 m horizontally 1000 ft (300 m) vertically
whichever is the higher	F G	5 km	Clear of cloud and with the surface in sight

An approach is considered stabilised when all of the following criteria are met :

- 1) The aircraft is on the correct lateral and vertical flight path;
- 2) Only small changes in heading and pitch are required to maintain correct flight path;
- 3) The aircraft speed is not lower than VAPP - 5 kts or not greater than VAPP + 10 kts (for ATR aircraft not lower than VAPP or not greater than VAPP + 10 kts);
- 4) The aircraft is in the correct landing configuration;
- 5) Sink rate is no greater than 1000 fpm. If an approach requires a sink rate greater than 1000 fpm, a special briefing shall be conducted;
- 6) Thrust setting is appropriate for the aircraft configuration as defined in the relevant aircraft type FCOM / FCTM;
- 7) All briefings and checklists have been completed;
- 8) All types of approaches need to fulfil the deviation limit criteria given in the relevant aircraft type FCOM / FCTM for lateral and vertical deviation;
- 9) Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing;

- 10) During a Circling approach, wings should be level on final when the aircraft reaches 300 ft AAL.

Note: Flying stabilised approach does not preclude flying a delayed flaps approach (decelerated approach) to comply with ATC instructions.

An approach that becomes **unstabilised** at or below the stabilisation gates requires an immediate **go-around**. The decision and execution of go-around shall be the responsibility of the Pilot-in-command. No attempt shall be made to reverse a go-around decision once it is initiated.

No punitive action will be taken against any crew that elect to go-around in accordance with Stabilised approach policy.

Unstabilised approach call-out (DGCA Operations Circular 15/2010 refers) :

Do not attempt to land from an unstable approach. Therefore, the following actions must be inducted in case of an approach becoming unstabilised at or below the stabilisation gates :

- 1) **First call :** PNF(PM) shall call **“Approach Not Stabilised”**.
- 2) **Second call :** If there is insufficient, incorrect or no response from the PF, the PNF(PM) shall loudly say **“Go-around Captain”**.
- 3) If no response from the Pilot-in-command, the PNF(PM) shall announce, loudly **“My controls Captain”** and transmit to ATC **“Go-around”** and immediately initiate appropriate go-around procedure safely with all available automation.

Warning: 360 degree turns below MSA are prohibited in the final approach phase.